Service Manual

Compact Disc Player

NESCO

HCD-50

XENON

CDH-03

COMPACT disc DIGITAL AUDIO

CIRCUIT OPERATIONS

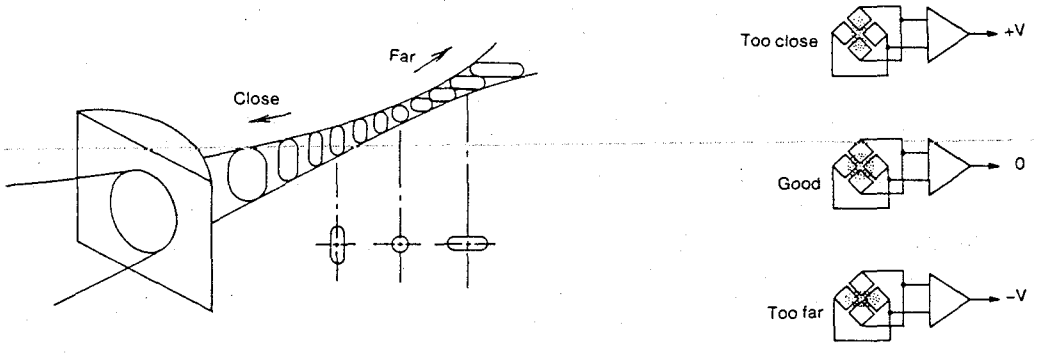
A. Laser pickup

The laser pickup comprises six photo diodes A to F; diodes A to D, consisting actually of one single diode which is divided vertically and hotizontally into four parts, for signal detection and diodes E and F for tracking servo.
Since the laser light scintillated onto the surface of compact disc is turbulently reflected by pit area and entirely reflected by no pit area, the digital signals in disc can be read out by detecting the reflected laser light.
The signals detected by photo diodes A to D is sent to U101(CX20109); signals from A+C are to #5(PD1) pin and B+D to #6(PD2) of U101 to be summed and generate an EFM signal at #3(RFO) pin. The test point marked EYE TP is the check point for the EFM signal. The EFM signal input to #2(RFI) pin is shape out by the comparator in U101 to be binary signals. The reference voltage of the comparator, at #22(ASY) pin of U101, varies in accordance with the shape of CD pits. It drifts up and down to the shape of the disc pit which normally equals to be zero. The binary EFM signal is sent from #20(EFM) pin of U101 to #5(EFM) pin of U301(CX23035).

B. Servo system
The player utilizes five servo circuits -- the focus servo, tracking servo, sled servo, laser output servo (APC) and CLV servo -- which are controlled by U303.

B-1 Focus control servo

The astigmatic method is employed for the focus control which utilzes the fact that routing the reflected laser light through a semi-cylidrical lens changes the shape of the beam in accordance with the distance.

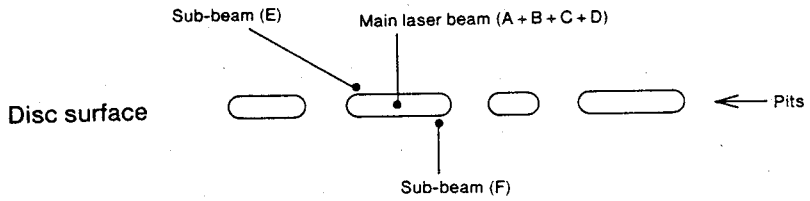


The theory of the astigmatic method

Providing a foculization is made at the point which the beam becomes a true circle, an out-focus condition due to too far or too close situation can be detected since it varies the shape of the beam.
The focus servo circuit generates the difference (A+C)-(B+D) from the laser pickup output signals (A+C) and (B+D). The foculization is perfect when this difference, the focus error signal, equals zero. U303 delivers the focus drive signal from the focus error signal which in turn applied to the tracking coil of the laser pickup to foculize. U303 sends this focus drive signal to the laser pickup from #21 pin(FEO). Q303 and Q304 amplify this signal and applies this signal to the laser pickup.

B-2 Tracking servo

Tracking servo is required to chase disc pit columns since CD systems do not have a guide to lead laser beam to the pit. The player employs 3-beam tracking servo system.



The 3-beam tracking servo

Three laser beams are irradiated towards the pits in slightly offset intervals to each other as shown. Servo is achieved by the following fact that: where the main beam (indicated by point [A+B+C+D] above, is precisely on the pit, (E-F) is zero; otherwise not).
The E and F signals, input from #8(E) and #11(F) pins of U101, generate (E-F) signal inside and delivered at #17(TE) pin. RV101(E-F BALANCE) adjusts for the balance of E and F signals; RV301(RADIAL OFFSET) is for the offset adjustment; RV302(RADIAL GAIN) is for the servo gain adjustment. The TE(tracking error) signal from U101 enters into #13 pin(TE) and U303 makes tracking servo control signal according to the tracing error signal. The tracking servo control signal goes out of U303 from #27 pin (TAO) and Q307 and Q308 amplify to drive the tracking coil of the laser pickup.
In searching for a track the laser pickup should be moved quickly, U304(CPU) transmits data to pins #8(DATA) to #10(CLK) of U303 which in turn delivers the pulse from pin #27(TAO) in accordance with the corresponding pulse width.

B-3 Sled servo

The sled servo serves for dual purpose -- to gradually move back and forth the entirely of the laser pickup in accordance with the procession of disc playing; and to move it quickly for searching tracks.
The lens of the laser pickup is able to travel at a small distance to follow the pits when playing with the entire pickup stopped. As it approaches the limit of the travelable range, DC components come to be contained in the tracking servo signals. The sled servo acts to detect the DC components and maintains the lens to be in the middle of the moveable range, namely to maintain the DC component to be zero.
The fraction of tracking servo signal from pin #27(TAO) of U303 through Q307 and Q308, only the DC component is extracted by R353, R354, C326, and C327 and applied to pin #25(SL+) of U303. This DC component is amplified in U303 and buffered by Q305 and Q306 and finally drives the sled motor. In regular operation, 0 to 0.4V DC is applied to rotate the sled motor every several seconds.
The sled motor is energized by the plus or minus DC at pin #23(SLO) of U303 corresponding to data from the CPU during searching the tracks.

B-4 APC (Auto Power Controller) circuit

The APC circuit is provided to maintain the constant laser output level in spite of the variation in temperature etc.
The monitor diode located in the close proximity of the lens feeds back the variation to keep the current flowing through the diode constant. The feed back voltage from the monitor diode is compared to reference voltage by U306. Q601 amplifies its output and applies to laser emission diode to control laser output. An "high" status of pin

#57(LASER) of U304 turns Q603 off and in turn Q602 on so that the output of U304 connected to ground. Therefore laser diode turns off.

Important note for servicing

To avoid burning out the laser diode, the APC connector shall not be disconnected whichever the power is on or off.
Before removing connector CN601 for servicing, be sure to solder on the shorting terminals on the laser head to short them out. While to assemble the head, first connect the CN601 to the pc board then open the terminals on the head and turn the power on. (The terminals can be accessed without removing the bottom plate of the unit by peeling the black sealing off.)

To determine the failure of the laser head, sizing the voltage across the head can be a key. Connect a digital voltmeter across R602 and press the PLAY button. The current (I) can be calculated as:

I = Voltage across R602 / 22 (ohm)

The laser head is normal if (I) is obtained within 10% of the value specified on the individual head. But I shows tendancy to increase when the laser pickup is used over 1000 hours.

15556 672	--- 67.2mA

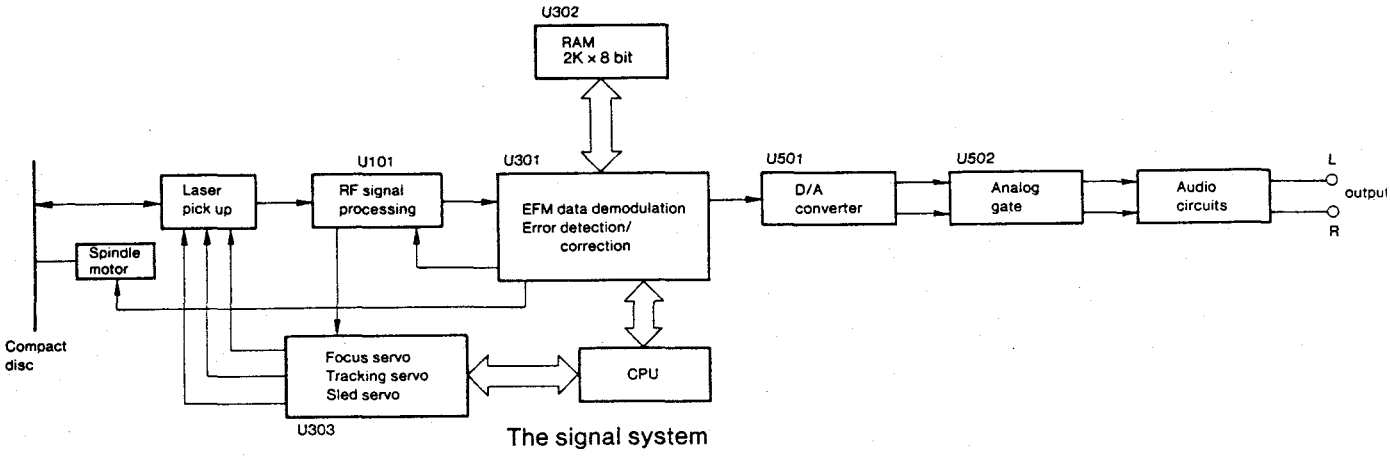
B-5 CLV (Constant Linear Velocity) servo circuit

Unlike analog records, the rotation of compact disc is 500rpm in inner area and 200rpm in outer area. The CLV servo acts to maintain the proper rotation of the motor. The reference to determine if the rotation is too fast or too slow depends upon the coincidence of the phase of the RF signal to U301 and the reference clock signal. The correct motor rotation causes a 50% duty signal delivered at pin #3(MDP) of U301; while a faster rotation causes a longer duty signal (a signal with the long "high" period of time); a slower rotation causes a shorter duty signal to be delivered. This signal is amplified by U305(1/2, 2/2), Q301, and Q302 and finally drives the spindle motor.

C. Signal system

The signals detected by the laser pickup are applied to U101 -- (A+C) to #5 pin(PD1); (B+D) to #6 pin(PD2) -- and generated as EFM signal of (A+B+C+D) and output at pin #3(RFO). The EFM signal is input to pin #2 and to the comparator inside U101 which rejects DC components from the EFM signal to an asymmetrical configuration so that convert it to the binary signal.
The EFM signal then input to pin #5(EFM) of U301 which serves to the demodulation of EFM data, reproduction of bit clock, error detection/correction, data interpolation, and sub-code demodulation, etc. Since to read out the data input to pin #5(EFM) of U301, the clock should be reproduced by the discrete VCO(Voltage Controlled Oscillator). The VCO clock frequency and EFM waveform are compared with each other in the phase comparator of U301 and the difference, if found, is delivered to pin #11(PDO) and filtered to be the smooth DC inside U301 finally controlling the VCO

frequency determined by L301, D301 and D302. This chain of PLL (Phase Locked Loop) circuit reproduces the bit clock, 4.32MHz.



The signal system

The reproduction of bit clock causes the demodulation of the EFM signal into digital data inside U301. and sending the demodulated data to store it in the RAM(U302). Should an error be found in the demodulated data, the stored data is recalled from the RAM for correction and interpolation and the correct data is sent pins #76(DA14) to #80(LRCK) of U301.
U501 is an integral type DAC(Digital-Analog Converter) which converts the clock and digital data input from pins #6(LATCH) to #10(DIN) into analog signals. This IC executes the D/A conversion on left and right channels alternatively. At the moment the integration for the D/A conversion is finished, current flows through analog switch U502 and input to U504. At next moment, Q501 or Q502 turns on and U501 resumes the D/A conversion again. Through the repetition of above process the digital data is transformed to the analog signals which in turn filtered into a smooth audio signal.
Q501 and Q502 are controlled by the CPU and switch to vary the response of the filter when the high frequency range of disc is emphasized. Q505 and Q506 are muting transistors for audio signals. At power turning on Q508 turns on and Q505 and Q506 are on, and the audio is muted. After 1 seconds since the power turning on, the level of pin #56(P-MUTE) of U304 is "high", Q507 turns off, cancelling the mute. At power turning off, Q508 base is "low" by the action of U307, Q505 and Q506R are on, muting the audio.

D. Control system

U304 serves as the system controller for the player. It excahnges data with the servo and signal systems to control the other stages, while controlling the functional controls and indicators. For the basing information, see section IC description.

E Power supply

The power supply circuit comprosing Q803 and Q804 feeds power to analog circuit

comprising U503 to U505, comparator, loading amp U307 and CLV amp U305. Q801 is the regurated supply for +8V, while Q802 is for -8V.
Q805 and Q806 feeds with ±5V power to all ICs other than above.

DISASSEMBLY/ASSEMBLY PROCEDURE

1. Disassembly

A. Top cover removal

(1) Remove four screws which fix the top cover on the chassis.
(2) Pull the cover backward.

B. Disc mechanism removal

(1) Remove the top cover.
(2) Remove two screws on the bottom which fix the disc mechanism.
(3) Remove a screw at the back of the disc mechanism. (fig.1)
(4) Remove five cables from the mechanism to the main pc board.
(6) Pull the mechanism backward gently.

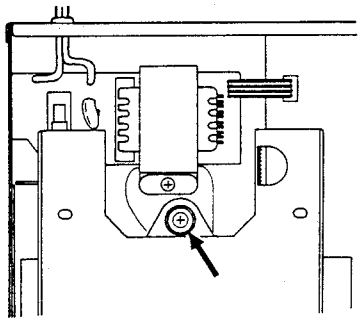
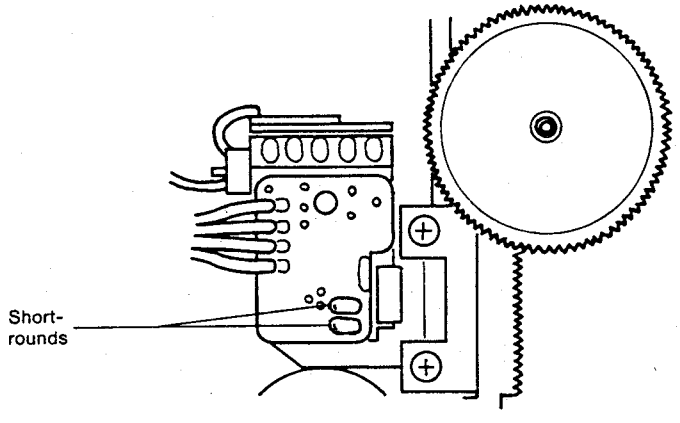


Fig. 1
Disc mechanism top view

CAUTION!

After disc mechanism removal, short the short-rounds on the laser pickup to protect it from static. (fig. 2.) Use a solder iron which has little leak current (e.g. with ceramic heaters).
Do not remove the connector CN601 while shorting and opening the short-rounds!
Do not touch the laser pickup when the short-rounds is not shorted!



The bottom of the laser pickup

Fig. 2

C. Front panel removal

(1) Remove the top cover.
(2) Remove four screws which fix the front panel on the chassis.
(3) Pull the panel frontward pushing sides outside.
(4) Remove four cables from the panel to the main pc board (CN307 - CN310). (fig. 3, 4)
To remove cables from connectors push the top of connector while pulling a cable.
Be sure not to add unnatural force to indicators when you asswmble the front panel.

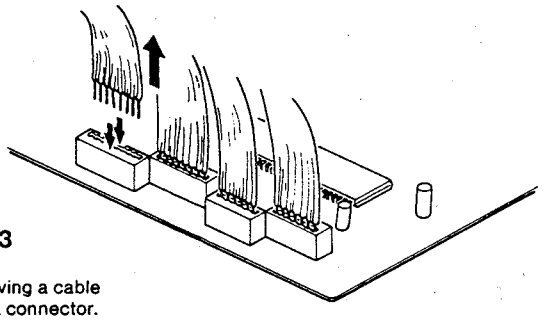


Fig. 3

Removing a cable from a connector.

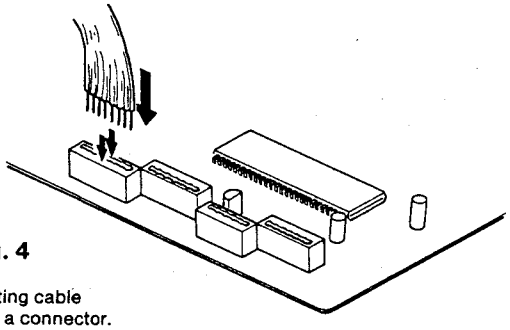


Fig. 4

Putting cable into a connector.

D. Main pc board removal

(1) Remove the top cover.
(2) Remove a screw on the rear panel which fixes the OUTPUT jacks on the rear panel.
(3) Remove two screws which fix the board on the chassis.
(4) Remove all connectors from the board.

E. Power supply unit removal

(1) Remove the top cover.
(2) Remove all the cables from this board to the main PC board.
(3) Remove two screws which fix the power transformer on the chassis.
(4) Remove the AC power cord from the board.

F. Switch pc board removal
(1) Remove the top cover.
(2) Remove two screws which fix the board on the front panel.
(3) Remove the board pushing six retainers outside. (fig. 5)
(4) Remove four cables from the board to the main pc board.

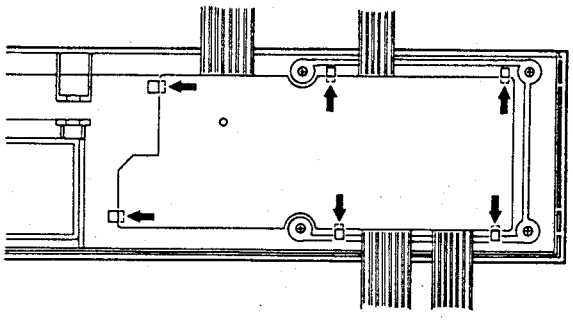


Fig. 5

2. Assembly

To assemble parts, make reverse manner of disassembly procedure basically. But to assemble the disc mechanism, follow the procedure below.

(1) Connect the connector marked CN601(black) to connectors on the main PC board.
(2) Open the short-round on the laser pickup.
(3) Insert floating bracket at the front of the disc mechanism to the front panel.
(4) Screw the rear of the disc mechanism on the chassis.
(4) Connect other cables to connectors on the main pc board.

Note: It is very important to keep the order of the above procedure.

ADJUSTMENT PROCEDURE

Before adjustment

- Allow a minimum of 10 minutes warm-up for the test equipments and the unit under test.
- Maintain rated ac line voltage.
- Before adjustment, confirm that the regulated ±5Vdc, ±8Vdc, ±16Vdc, -24Vdc power supplies operate correctly.

Instruments required

- Oscilloscope
- Frequency counter
- Test disc; Sony Type 4 (YEDS-18)

A. To introduce the test mode

The test mode is introduced by grounding the test point, marked CHECK MODE on the main pc board, during the power is off or disc tray is open (out).

B. Tracking offset adjustment

(1) Connect scope to test point TRACKING and to ground.
(2) Set the unit to the check mode, see procedure A above, and turn the power on.
(3) Without disc loaded or in standby condition, adjust RV302 for ±0V on scope.

C. PLL frequency adjustment/Lock frequency check

(1) Ground test point ASY.
(2) Connect frequency counter to test point PLL and to ground.
(3) Turn the power on and adjust RV303 for 0V at J301(VCO).
(4) Adjust L301 for 4.3000MHz on the counter.
(5) Disconnect test point ASY from ground.
(6) Load with test disc YEDS-18 and press the PLAY button.
(7) Check counter reads 4.3218MHz.

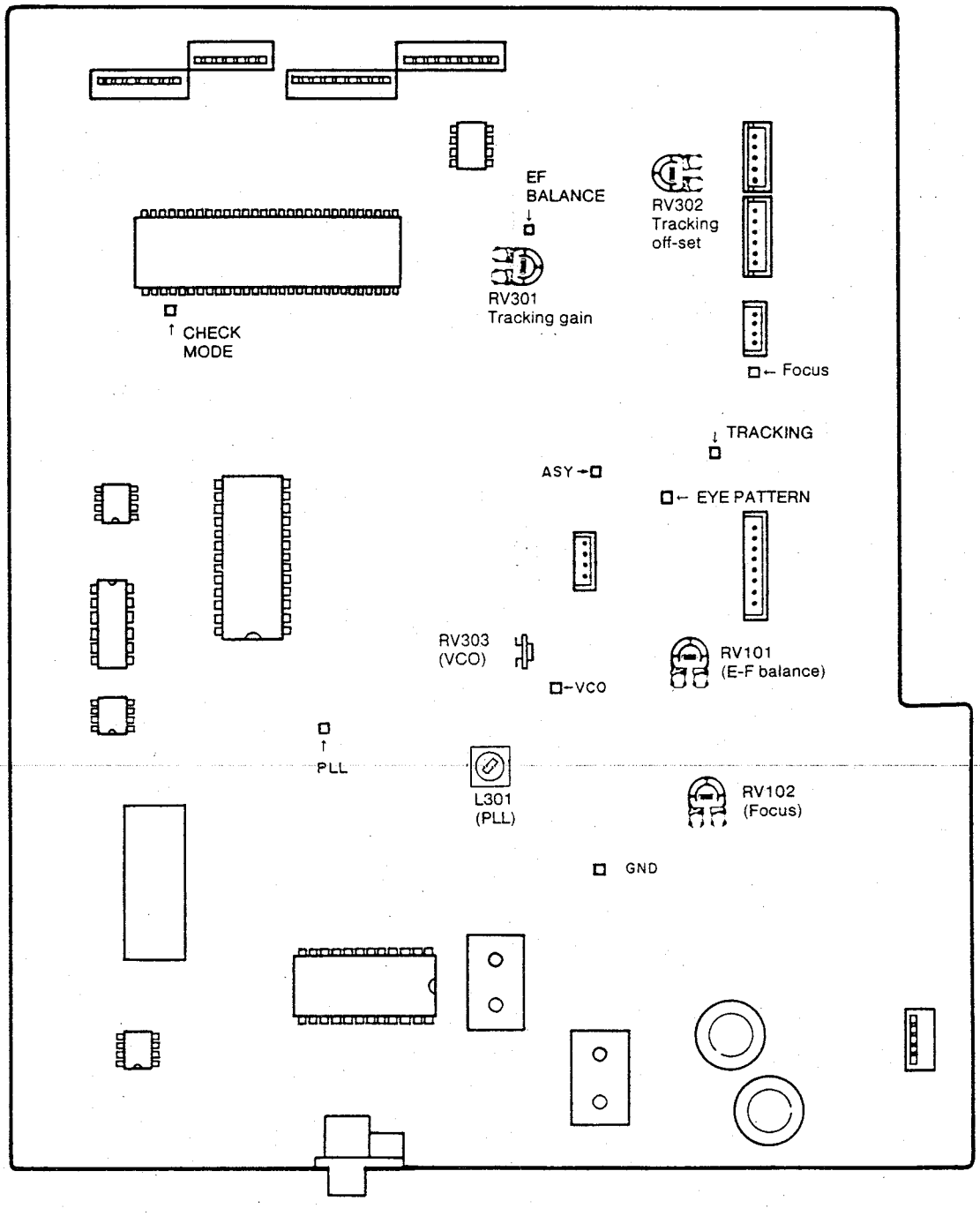
D. Focus offset adjustment.
(1) Connect scope to test point EYE PATTERN and to ground.
(2) Load with disc YEDS-18 and press the PLAY button.
(3) Adjust RV102 for the view on scope which follows:
(Adjust for a clear, distinct shape of the diapers.)

E. E-F balance adjustment

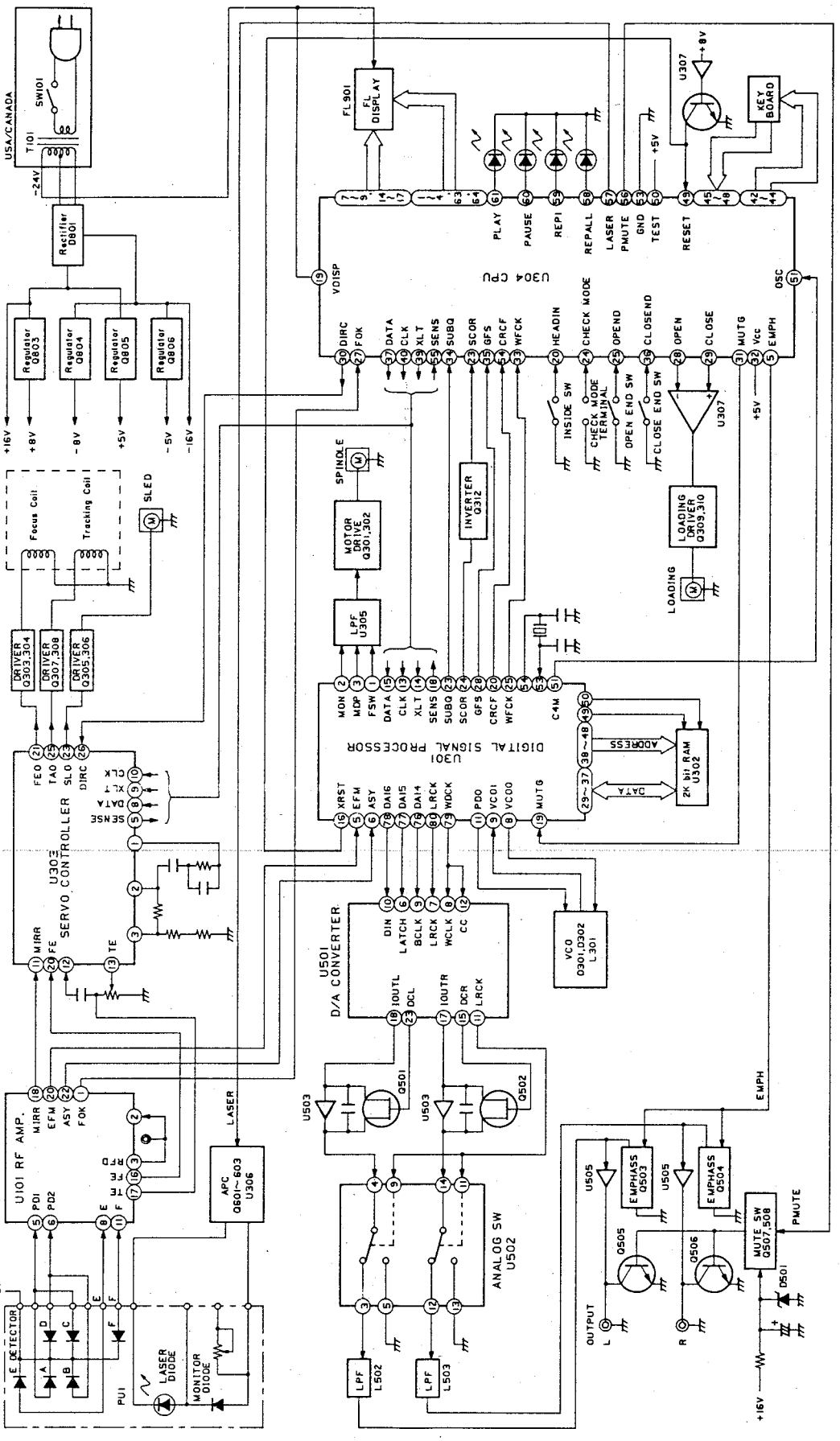
(1) Connect scope to test point EF BALANCE and to ground.
(2) Turn the power on.
(3) Load with test disc YEDS-18 and press the PLAY button.
(4) Mark the position of RV301 and turn RV301 to full clockwise.
(5) Adjust RV101 so that the signal has the symmetrical plus swing and minus swing on scope. Enlarge the waveform for accurate adjustment.
(6) Reset RV301 to original position.

ADJUSTMENT POINT

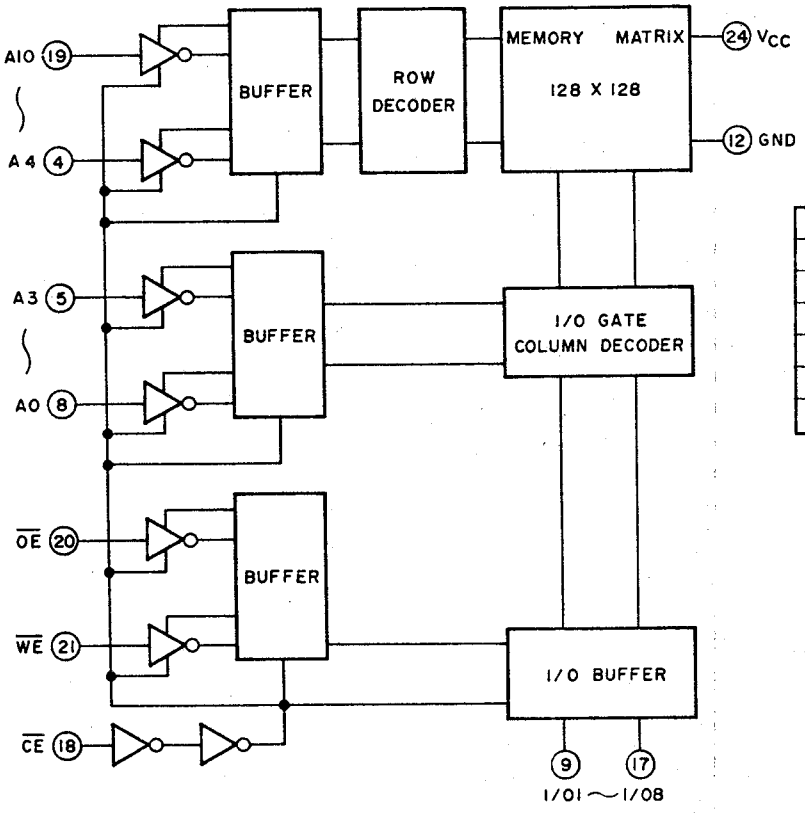
Main PC board



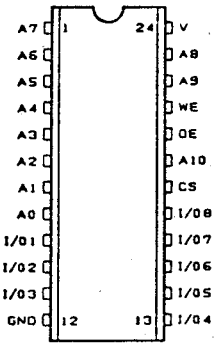
BLOCK DIAGRAM



IC DESCRIPTION



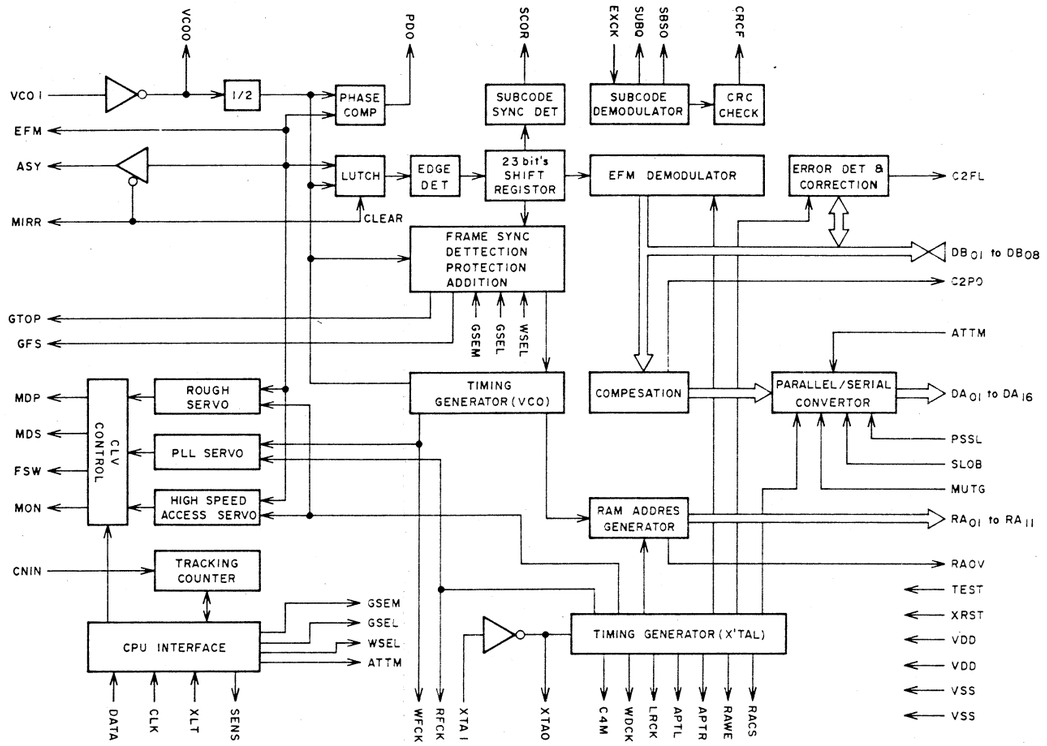
A0 ~ A10	Address input
I/O1 ~ I/O8	Data IN/OUT
$\overline{CE}$	Chip enable signal input
$\overline{WE}$	Write enable signal input
$\overline{OE}$	Output enable signal input
Vcc	+5V
GND	GND



Static RAM (U302)

D/A convertor (CX20152, U501)

Pin No.	Symbol	Description	
1	DVEE	−5V	
2	SUB	Substrate −5V, same level as DVEE	
3	SCLK	NC	
4	VCC	+5V	
5	ON/OFF	NC	
6	LATCH	Clock input for D-Flip Flop	
7	LRCK	L-ch, R-ch clock, "Low" R-ch, "High"L-ch	
8	WCLK	Word Clock	
9	BCLK	Bit Clock	
10	DIN	Data In	
11	LRCK OUT	L-ch, R-ch Clock Out	
12	CC	Conversion command input	
13	DGND	Digital GND	
14	DVEE	−5V	
15	DCR	R-ch discharge control signal out	LRCK"HIGH"
16	ISET	Current set control signal for IOUTR, IOUTL	
17	IOUTR	R-ch current signal OUT	LRCK "HIGH"
18	IOUTL	L-ch current signal OUT	LRCK "LOW"
19	—	NC	
20	AVEE	−5V	
21	AGND	Analog GND	
22	DGND	Digital GND	
23	DCL	L-ch discharge control signal out	LRCK "LOW"
24	DC BIAS	DC Bias for discharge (2.5 mA)	
25	COUT	Clock Out	
26	CIN	Clock In	
27	$\overline{CIN}$	Clock In	
28	DGND	Digital GND	



CX23035

Pin No.	Symbol	I/O	Description
1	FSW	O	Spindle motor filter switching control
2	MON	O	Spindle motor ON/OFF control
3	MDP	O	Spindle motor speed and phase control
4	MDS	O	Spindle motor speed control
5	EFM	I	EFM signal input
6	ASY	O	EFM signal slice level control
7	MIRR	I	MIRR signal input "L" on track "H" mirror
8	VCOO	O	VCO output f = 8.6436 MHz
9	VCOI	I	VCO input
10	TEST	I	0V (GND)
11	PDO	O	Phase comp. output
12	VSS	—	GND (0V)
13	CLK	I	Clock signal from CPU
14	XLT	I	Lutch signal from CPU
15	DATA	I	Serial data from CPU
16	XRST	I	RESET input "L" reset
17	CNIN	I	Tracking pulse input (+5V)
18	SENS	O	Output of CPU interface
19	MUTG	I	Mute control signal input
20	CRCF	O	CRC check output of the subcode Q "L" detect error
21	EXCK	I	Not used
22	SBSO	O	Not used
23	SUBQ	O	Subcode Q output
24	SCOR	O	Subcode sync detection output
25	WFCK	O	Not used (Write frame clock)
26	RFCK	O	Not used (Read frame clock)
27	GTOP	O	Frame sync detection output
28	GFS	O	"H" frame sync lock "L" frame sync unlock

Pin No.	Symbol	I/O	Description
29	DB08	I/O	Data 8 (MSB)
30	DB07	I/O	Data 7 — Data Bus line for the EXT. RAM
31	DB06	I/O	Data 6 — (CXK5816P-15L)
32	DB05	I/O	Data 5
33	VDD	—	+5V
34	DB04	I/O	Data 4
35	DB03	I/O	Data 3 — Data Bus line for the EXT. RAM
36	DB02	I/O	Data 2 — (CXK5816P-15L)
37	DB01	I/O	Data 1 (LSB)
38	RA01	O	ADDR01 (LSB)
39	RA02	O	ADDR02
40	RA03	O	ADDR03
41	RA04	O	ADDR04
42	RA05	O	ADDR05 — Address signal output for the EXT.
43	RA06	O	ADDR06 — RAM (CXK5816P-15L)
44	RA07	O	ADDR07
45	RA08	O	ADDR08
46	RA09	O	ADDR09
47	RA10	O	ADDR10
48	RA11	O	ADDR11 (MSB)
49	RAWE	O	Write enable signal output "L" active
50	RACS	O	Chip select signal output "L" active
51	C4M	O	Not used
52	VSS	—	GND (0V)
53	XTAI	I	X'TAL OSC. input f = 8.4672 MHz
54	XTAO	O	X'TAL OSC. output f = 8.4672 MHz
55	C2FL	O	Monitor of error detection *
56	C2PO	O	Not used
57	RAOV	O	Not used
58	SLOB	I	0V (GND)
59	PSSL	I	0V (GND)
60	APTR	O	Not used
61	APTL	O	Not used
62	DA01	O	C1F1 *
63	DA02	O	C1F1 *
64	DA03	O	C2F1 * — Not used
65	DA04	O	C2F2 * — Not used
66	DA05	O	UGFS — Not used
67	DA06	O	$\overline{\text{WFCK}}$ INV write frame clock signal output
68	DA07	O	Not used FCKV 1/4 or 1/8 WFCK output
69	DA08	O	Not used FCKX 1/4 or 1/8 RFCK output
70	DA09	O	Not used $\overline{\text{PLCK}}$ 1/2 VCO output
71	DA10	O	Not used $\overline{\text{LRCK}}$ INV. LRCK (Pin 80)
72	DA11	O	Not used C4LR 176.4 kHz strobe signal output
73	VDD	—	+5V
74	DA12	O	Not used $\overline{\text{DENL}}$ L-ch serial data enable signal
75	DA13	O	Not used $\overline{\text{DENR}}$ R-ch serial data enable signal
76	DA14	O	$\overline{\text{C210}}$ INV. C210 (Pin 77)
77	DA15	O	Not used C210 Bit clock — f = 2.1168 MHz
78	DA16	O	Data output
79	WDCK	O	Worde clock output — 88.2 kHz strobe signal
80	LRCK	O	L-ch, R-ch clock output — 44.1 kHz strobe signal

* Monitor Signal refer to Fig. 1 & Fig. 2

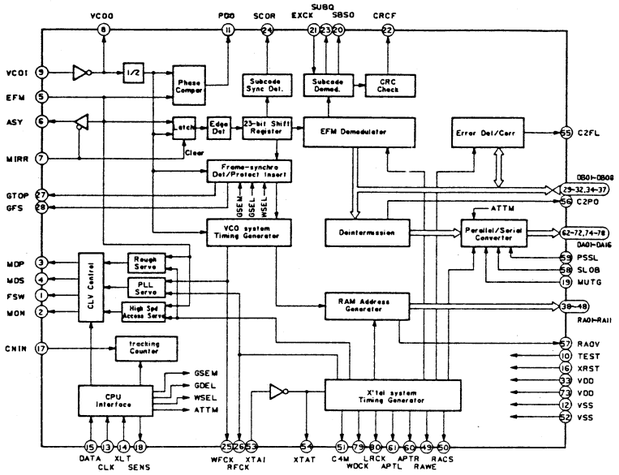
C1F1	C1F2	C1 Correction
O	O	No error
I	O	Signal error correction
O	I	Double error correction
I	I	Irretrievable error

Fig. 1

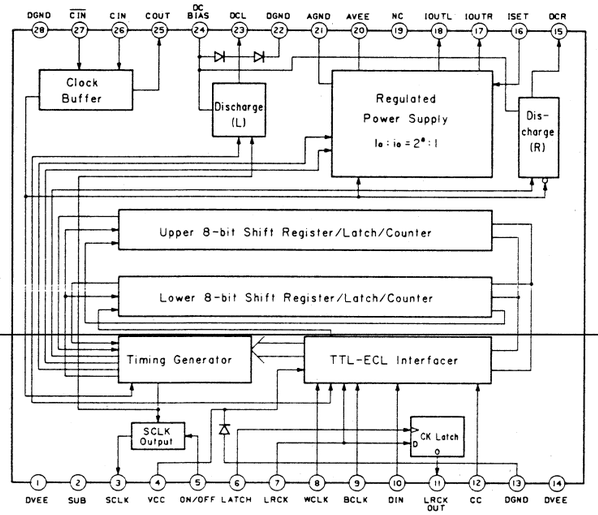
C2F1	C2F2	C2FL	C2 Correction
O	O	O	No error
I	O	O	Signal error correction
O	I	O	Double error correction
I	I	I	Irretrievable error

Fig. 2

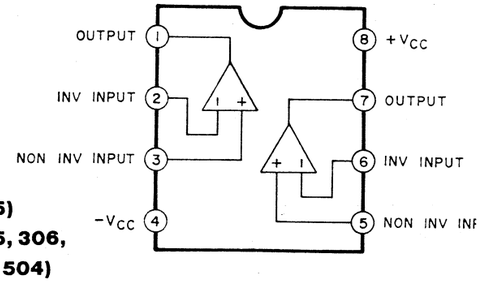
IC DESCRIPTION



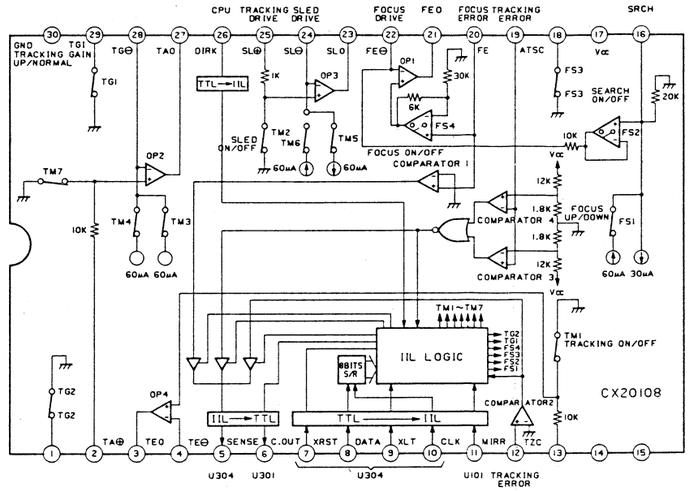
Digital signal processor (CX23035, U301)



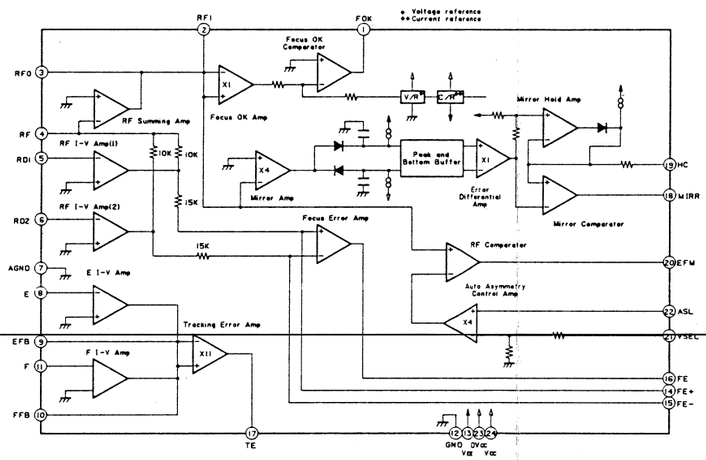
D/A convertor (CX20152, U501)



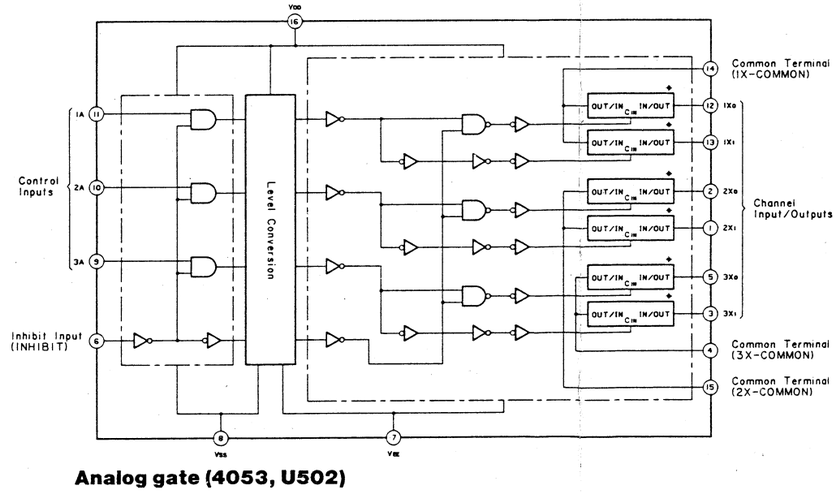
OP amp.
(M5218: U505)
(M5221: U305, 306, 503, 504)



Servo controller (CX20108, U303)



RF amplifier (CX20109, U101)



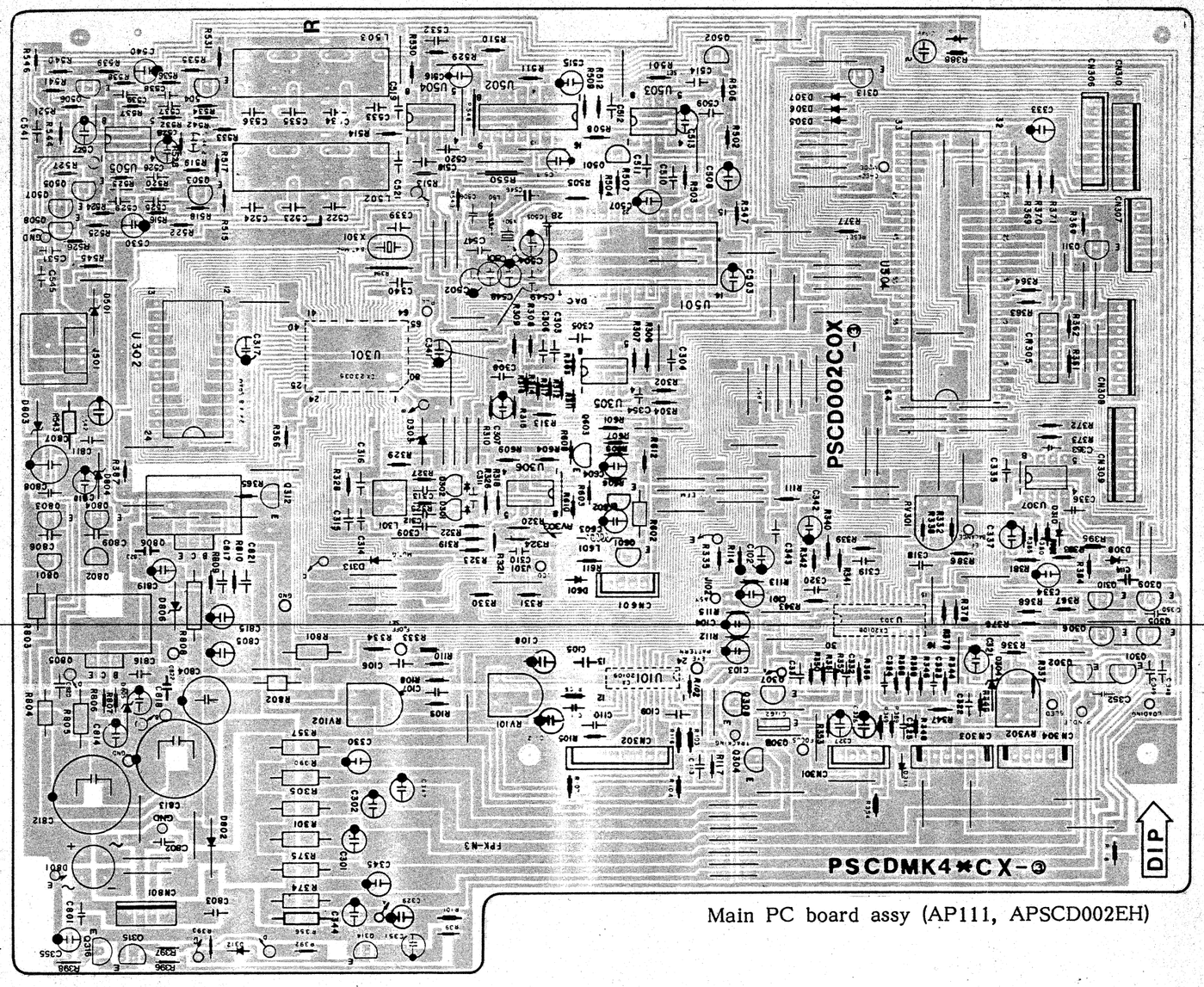
Analog gate (4053, U502)

CPU (U304, HMCS404C) function table

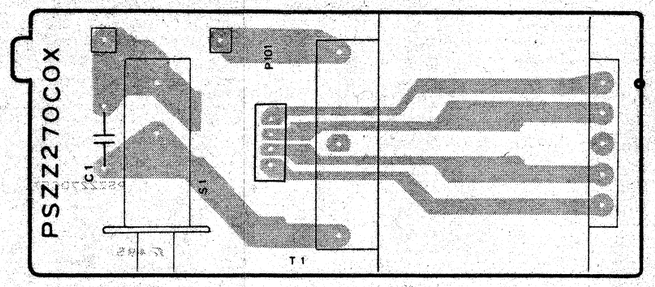
Pin No.	Signal Name	I/O	Description
1	DIG3	O	Display digit data
2	DIG4	O	Display digit data
3	DIG5	O	Display digit data
4	DIG6	O	Display digit data
5	EMPH	O	If disc data is emphasized, this signal becomes high automatically.
6	----	-	Not used
7	SEG1	O	Display segment data
8	SEG2	O	Display segment data
9	SEG3	O	Display segment data
10	----	-	Not used
11	----	-	Not used
12	----	-	Not used
13	----	-	Not used
14	SEG4	O	Display segment data
15	SEG5	O	Display segment data
16	SEG6	O	Display segment data
17	SEG7	O	Display segment data
18	WFCK	I	7.35kHz clock
19	VDISP	-	-22V
20	HEADIN	I	If the pickup goes to the inner limit SW, this signal becomes low.
21	----	-	Not used
22	----	-	Not used
23	SCOR	I	75Hz clock
24	TEST	I	This terminal should be low for test mode.
25	OPENEND	I	When the disc tray fully opens, this signal becomes low.
26	MEMLED	O	Becomes low to light the MEMORY LED.
27	FOK	I	If focus is in, this signal becomes high.
28	OPEN	O	When this signal is low and CLOSE signal is
29	CLOSE	O	high, the disc tray opens. When this signal is high and CLOSE signal is low, the tray closes. In the PLAY mode, both are high.
30	DIRC	O	Controls the pickup for direct track selection.
31	MUTG	O	Becomes high to mute the digital line.
32	Vcc	-	+5V
33	WFCK	I	7.35kHz clock
34	SUBQ	I	Subcode data input
35	GFS	I	When the U301 reads data normally, this becomes high. If this becomes low for 5 sec. the CPU judges the disc is bad and opens the tray.
36	CLSEND	I	When the tray closes completely, this becomes low.
37	DATA	O	Servo control signal for U301, U303.
38	----	-	Not used.
39	XLT	I	Servo control signal for U301, U303.
40	CLK	I	Servo control clock for U301, U303.
41	SCAN1	O	Keyboard scan signal.
42	SCAN2	O	Keyboard scan signal.
43	SCAN3	O	Keyboard scan signal.
44	SCAN4	O	Keyboard scan signal.
45	RET1	I	Keyboard return signal.
46	RET2	I	Keyboard return signal.
47	RET3	I	Keyboard return signal.
48	RET4	I	Keyboard return signal.
49	RESET	I	Reset input signal.
50	TEST	I	Becomes high for test mode.
51	OSC1	I	CPU clock, 4.235MHz.
52	OSC2	-	Not used.
53	GND	-	Ground terminal
54	CRCF	I	Becomes high when the CRC check.
55	SENSE	I	Internal status of the U301, U308.
56	PMUTE	O	Becomes high to mute the signal when the power is on. After 3 sec. this becomes low.
57	LASER	O	Becomes high when the laser is on.
58	REPALL	O	Becomes high to light the ALL REPEAT LED.
59	REP1	O	Becomes high to light the REPEAT ONE LED.
60	PAUSE	O	Becomes high to light the PAUSE LED.
61	PLAY	O	Becomes high to light the PLAY LED.
62	REMAIN	O	Becomes high to light the REMAINING LED.
63	DIG2	O	Display digit data
64	DIG1	O	Display digit data

WIRING BOARD LAYOUT

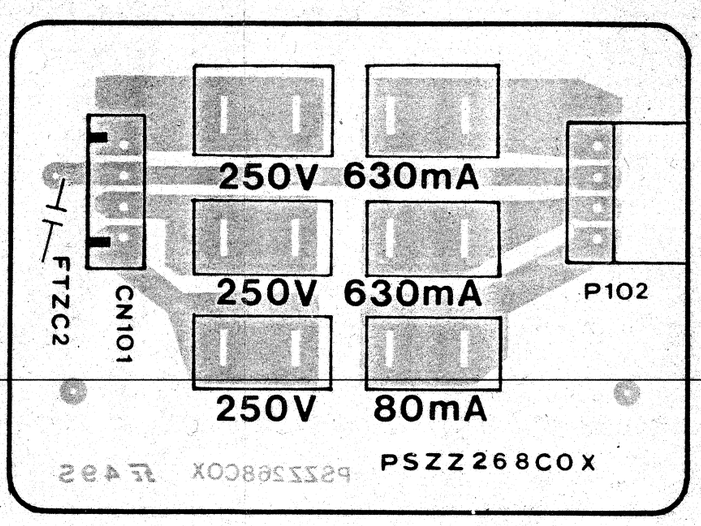
Component side



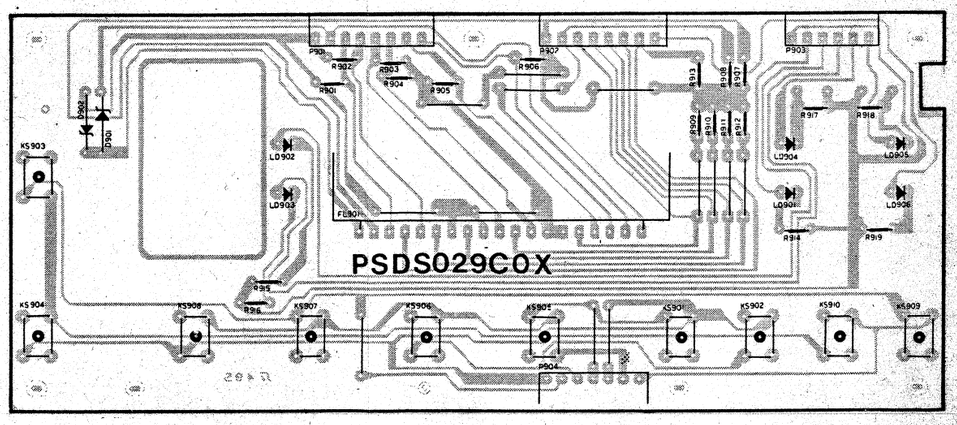
Main PC board assy (AP111, APSCD002EH)



Power PC board ass'y (AP112, APSZZ270CH)



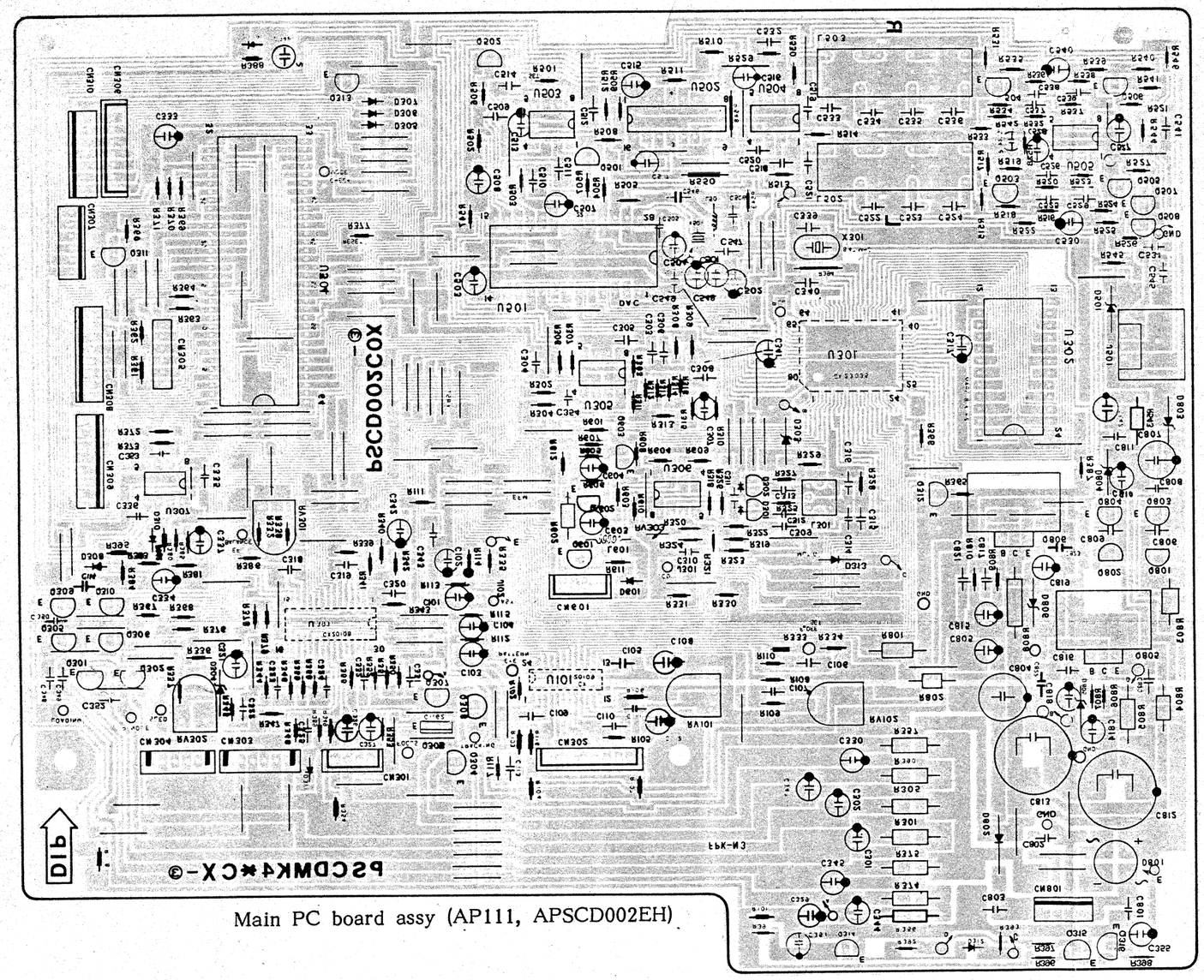
Fuse PC board assy (AP113, APSZZ268AH)



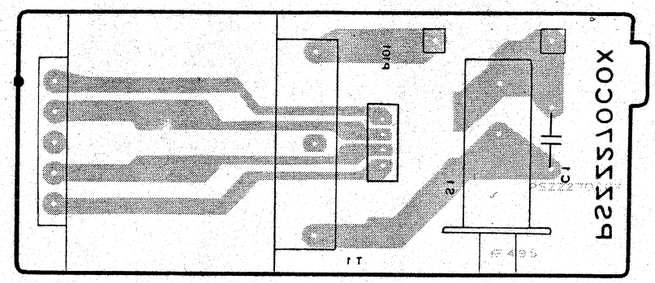
Display PC board assy (AP114, APSDP029AH)

WIRING BOARD LAYOUT

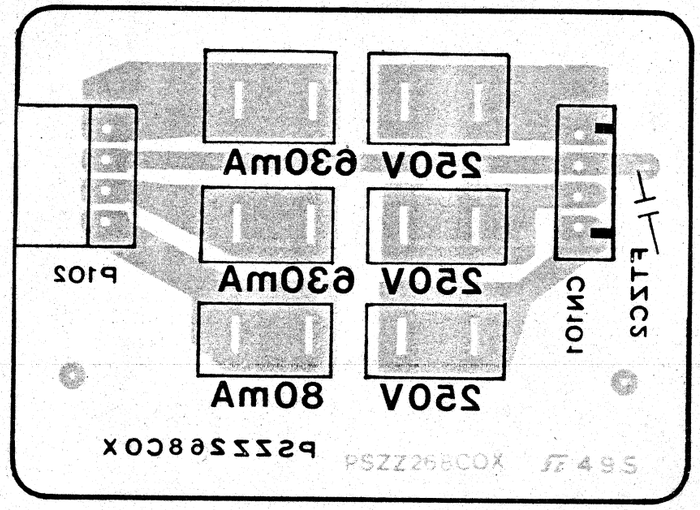
Pattern side



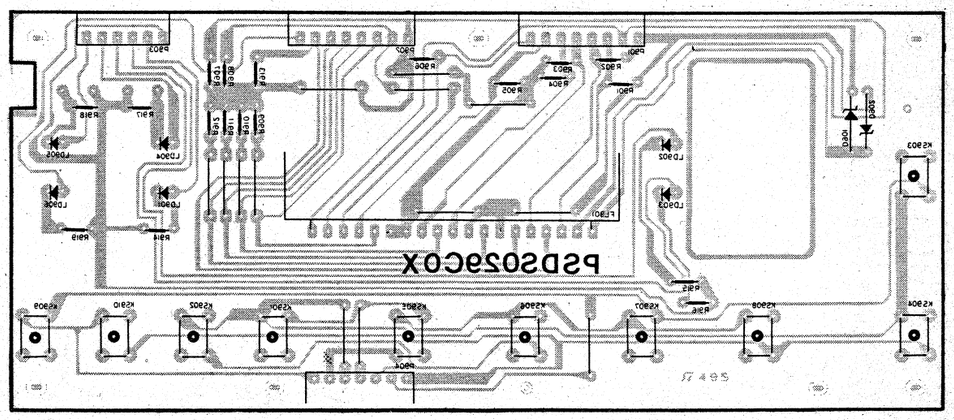
Main PC board assy (AP111, APSCD002EH)



Power PC board ass'y (AP112, APSZZ270CH)

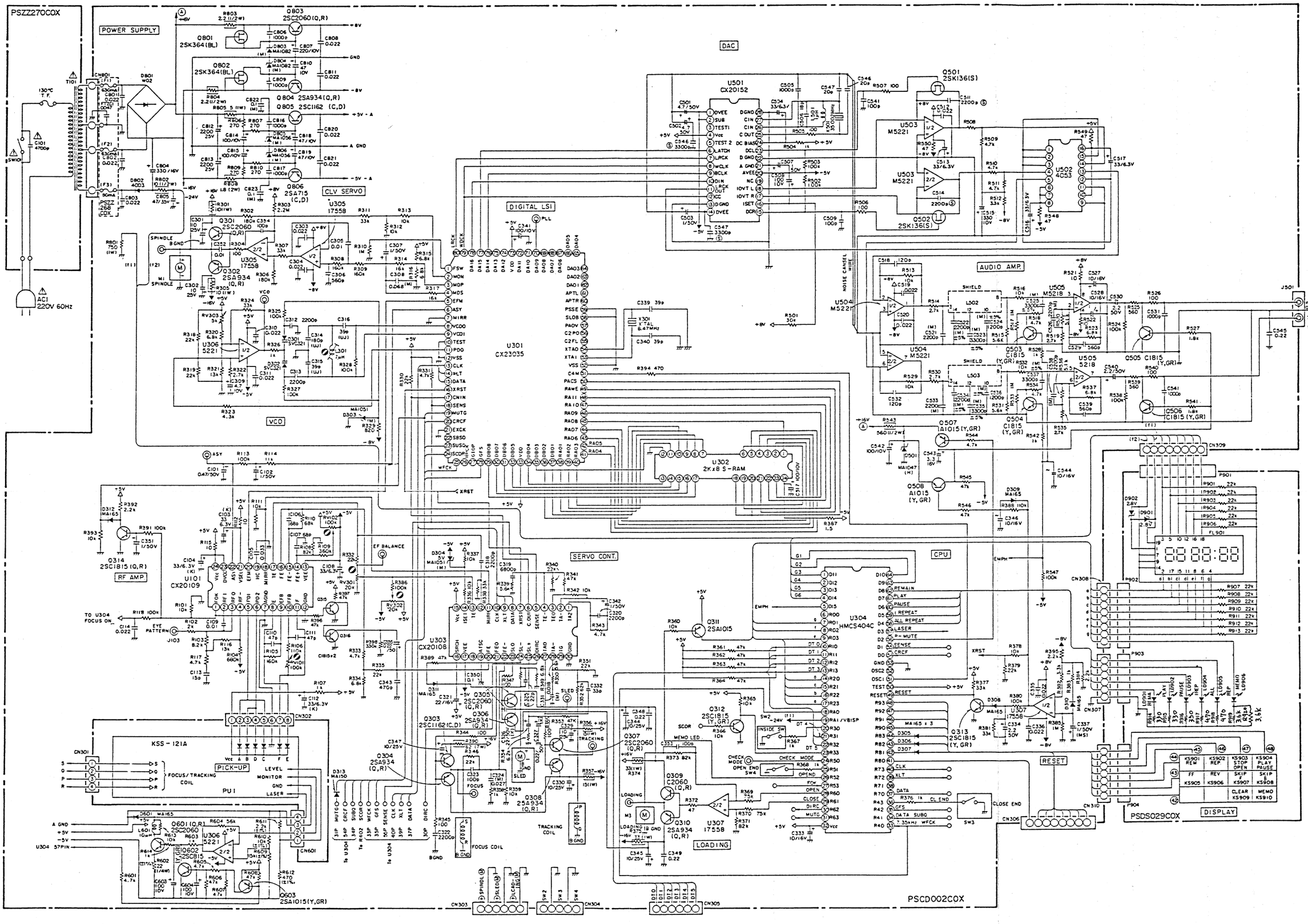


Fuse PC board assy (AP113, APSZZ268AH)



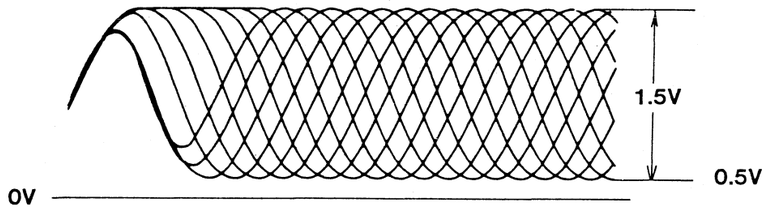
Display PC board assy (AP114, APSDP029AH)

SCHEMATIC DIAGRAM

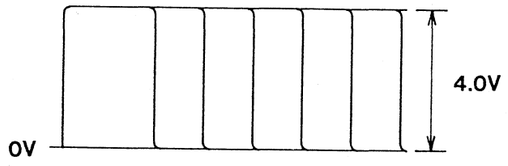


TEST POINTS AND WAVEFORMS

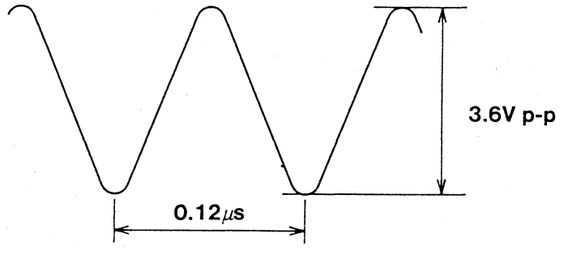
1. EYE PATTERN



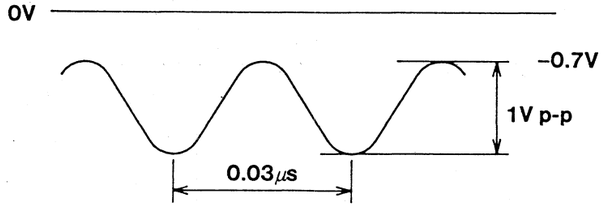
2. EFM



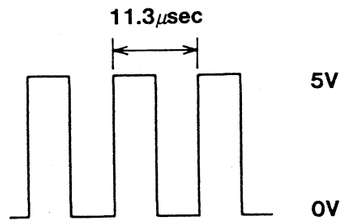
3. X301
(U301 54 pin)



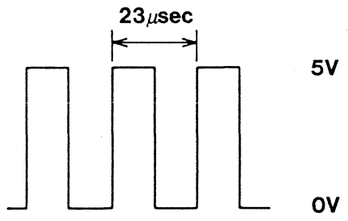
4. X501
(U501 25 pin)



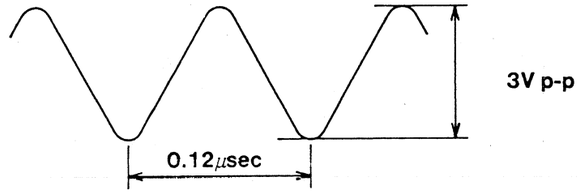
5. U501 ⑧ pin
WCLK



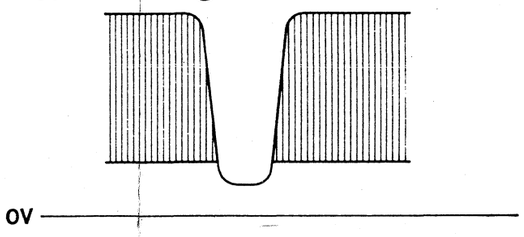
6. U501 ⑦ pin
LRCK



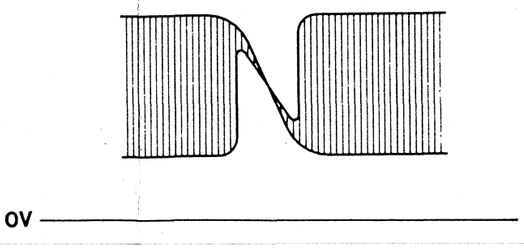
7. VCOO
U301 ⑧ pin



8. EYE PATTERN
Scratched disc ①

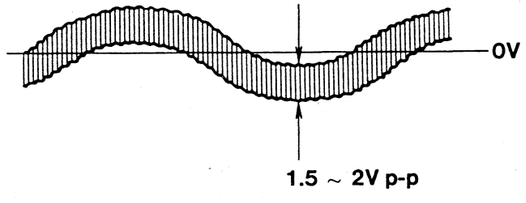


Scratched disc ②



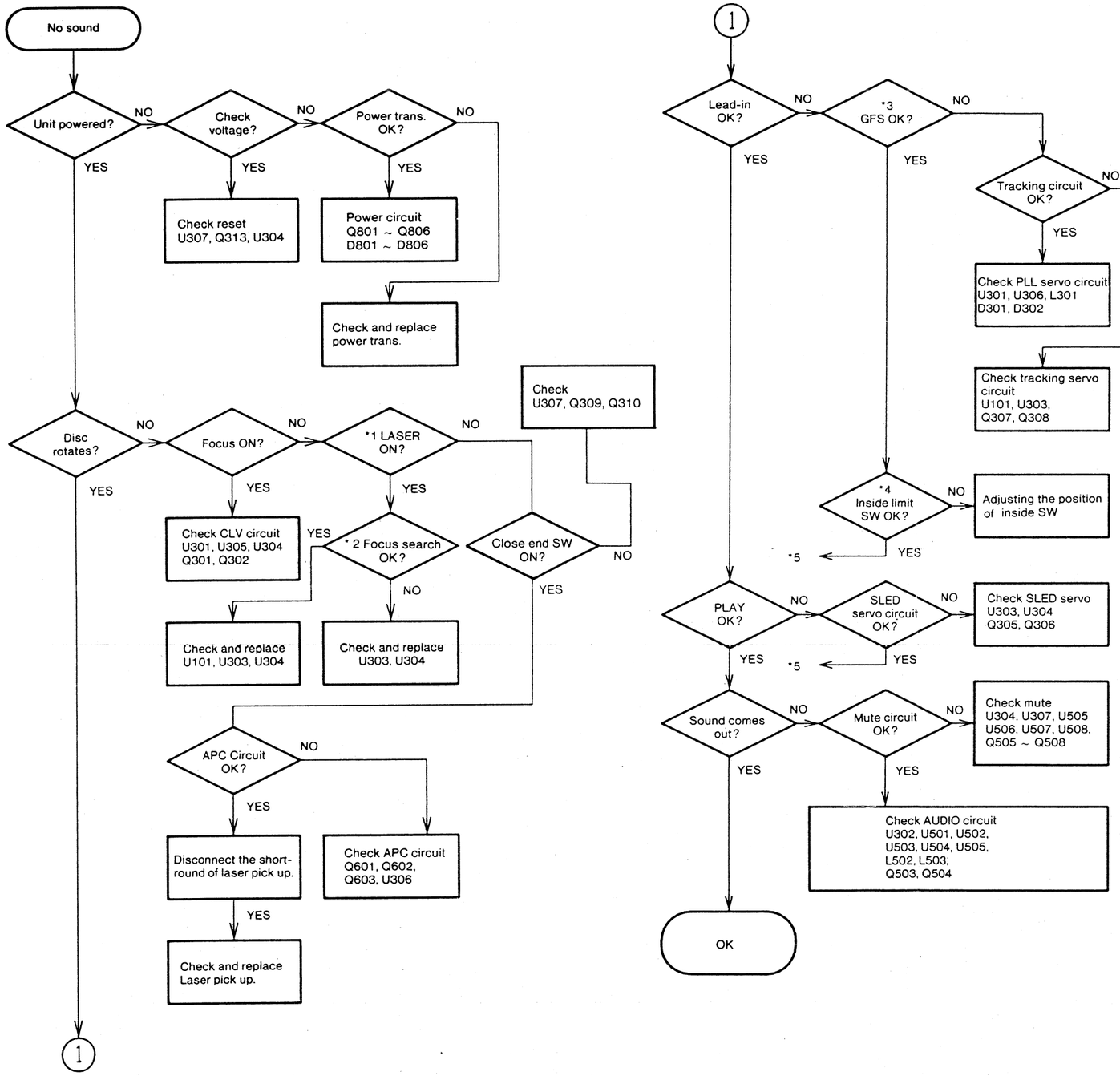
9. TRACKING

Eccentric disc



Normal disc

QUICK TROUBLE SHOOTING



*1 Laser diode light check
a. Checking light with your eyes.
The object lens of the laser pickup goes up and down for four seconds when the disc tray closes with no disc. While the lens goes up and down, check that laser goes from the laser pickup.

b. Caution
Keep your eyes from the laser pickup in 12 inches distance when checking the laser light from the laser pickup.
The laser pickup is not visible from right above it. View the pickup from slant upper side.

*2 Focus search
After the disc tray is closed with no disc, the laser pickup goes to inside of the disc tray and the object lens goes up and down.
If the player does not perform above motion, chack the close end switch and indide limit switch.

*3 GFS signal
Judgement of frame sync. (U304, 35pin). When it is locked GFS signal is "high".

*4 Position of the inside limit switch
Check the position of the switch is in the disc lead-in area. Connect the test pin marked "CHECK MODE" to ground. The display shows the track time when the laser pickup is at the switch. Keep this time between -4:00 -- 5:20 (Sony test disc type 4 only) by adjusting the position of the switch.

*5 To find inferiority of a disc.
If a disc is inferior even if the player is normal, playback is impossible. When you judge that the disc is inferior make following tests.

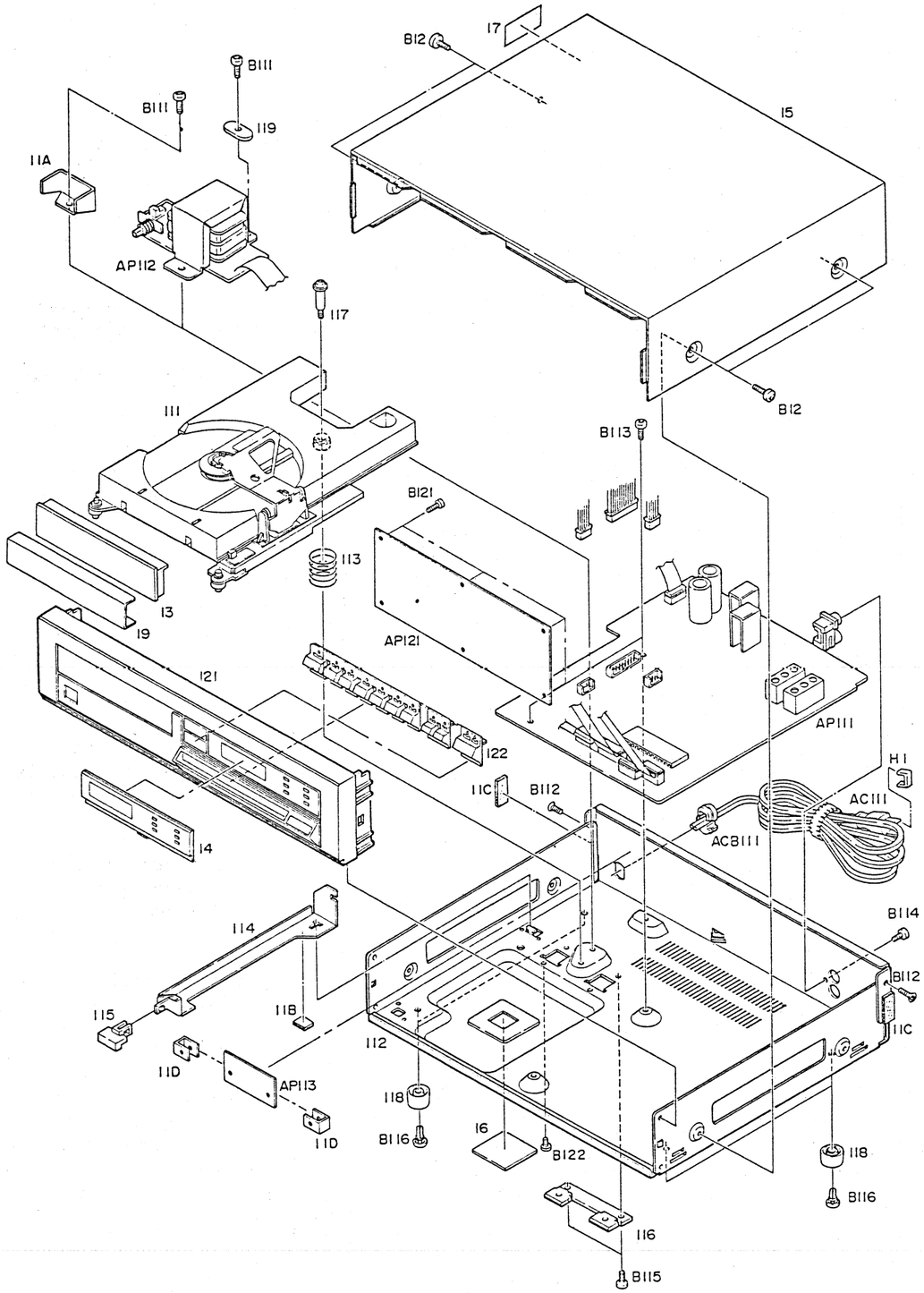
a. Scratches, dirt and pin holes
Take a careful looking at the disc. If there is dirt or finger prints wipe it off. If you do not see scratches or pin holes on the disc, check the RF signal.

b. Eccentricity
Check the waveform of the tracking servo signal.

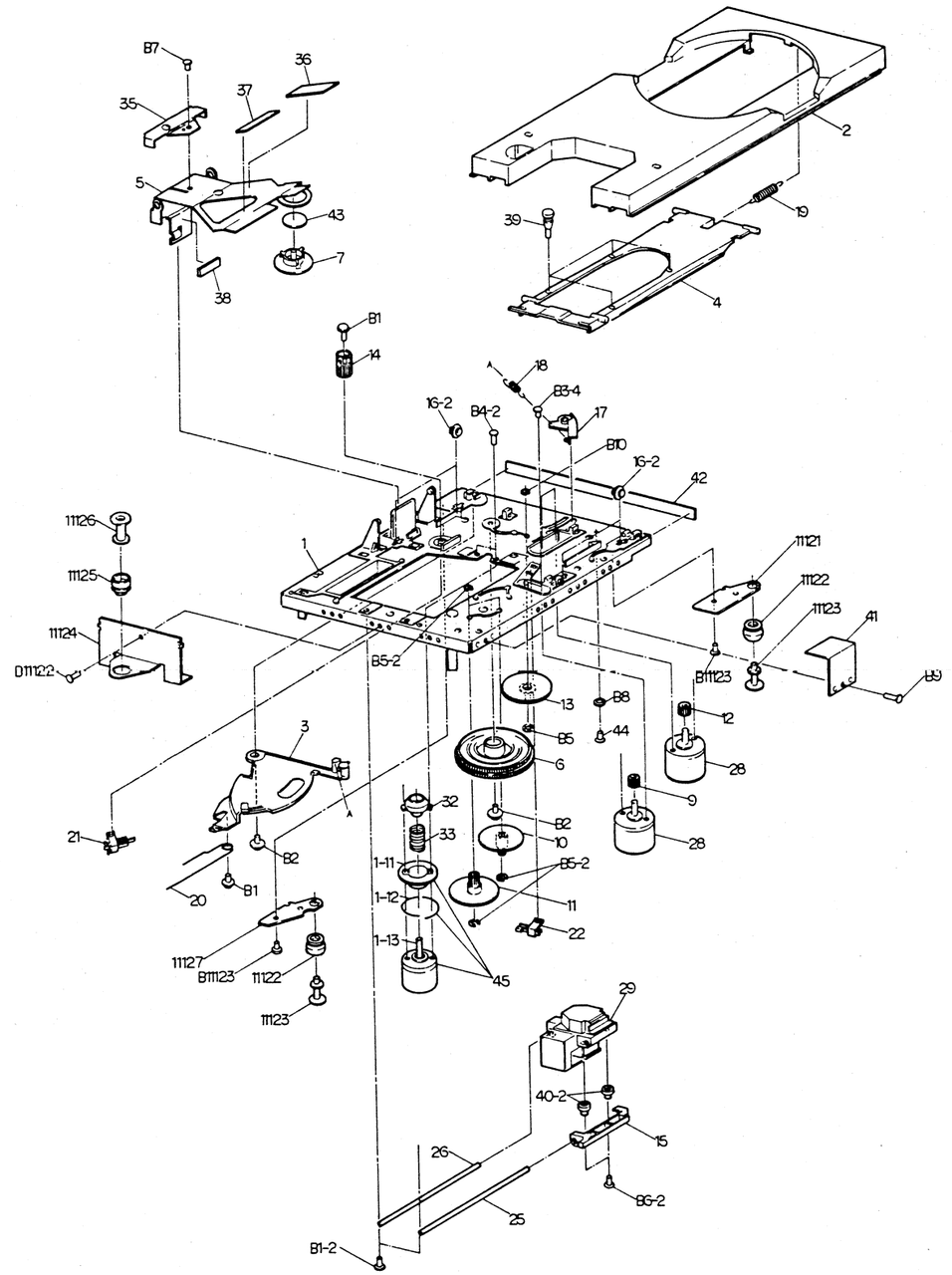
c. Out of focus
When the disc is bent, focus is out. Check the focus tracking signal.
In this case chucking operation may be incorrect. When the disc is normal, a horizontal and vertical motion of the disc is within 0.3mm. If it is over 0.3mm, check the disc table, sliding chuck and chuck arm.

EXPLODED VIEW

Over all



Disc mechanism



REPLACEMENT PART LIST

General-1 (Set assy elements)

Ref. No.	Part code	Description
11	AYCDH03*01	Chassis assy
12	AYCDH03*02	Front frame assy
13	VE73JSM002	Lid, disc drawer
14	VS734AK002	Filter, display
15	MU886SX013	Top cover
16	VS445VF001	Sheet, blind
B 11	BTPS3006TZ	Screw, M3x6, front frame
B 12	BTPB4008TB	Screw, M4x8, top cover

General-2 (Chassis assy, AYCDH03*01)

Ref. No.	Part code	Description
11A	MB544SL001	Bracket, mechanism(rear)
11B	VS228RF006	Sponge
11C	VS428RF002	Sheet
11D	MB111SZ001	Bracket
11E	VS643VF001	Barrier, fuse
111	MB886SK013	Chassis
1111	AMCD01**01	Disc mechanism assy
1112	AYF1MU**04	Bracket part kit
112	AMF1MU**01	Disc mechanism & bracket
113	MW271LY008	Spring, mechanism
114	MB843SL001	Joint, knob + power SW
115	VN333SB001	Knob, power
116	VK163SB004	Plate, lock
117	MT563SZ004	Shaft (B)
118	VM174RB001	Pedestal
119	MS317SZ006	Plate
AC111	ACAC269EEA	AC cord + plug
AC112-3	ACZZ507ULA	Earth wire
ACB111	VM270NB004	Bushing, AC cord
AP111	APSCD002EH	PC board assy, main
AP112	APSZZ270CH	PC board assy, power
AP113	APSZZ268AH	PC board assy, fuse
B111	BTPB4008TZ	Screw, M4x8
B112	BTPS3006TZ	Screw, M3x6
B113	BTPB3006TZ	Screw, M3x6
B114	BTPB3008PB	Screw, M3x8
B115	BTPB3010T2	Screw, M3x10 (shipping)
B116	BRP4050QNB	River, plastic M4x5
B117	BSPB3012NB	Screw, M3x12, fuse PC board
B119	BTPB3006TZ	Stopper, power SW

Front frame assy (AYCDH03*02)

Ref. No.	Part code	Description
121	VE86JSM062	Front frame
122	VN270SK002	Frame, button
123	VE86JSM064	Frame, front
AP114	APSDS029AH	PC board assy, display
B121	BTPP2606PZ	Screw, M2.6x6

Miscellaneous

Ref. No.	Part code	Description
31	KTCDH03*XX	Owner's manual
41	KPCDH03*01	Carton
43	KNCD200*01	Partitioner(L)
44	KNCD200*02	Partitioner(R)

Disc mechanism assy (AMCD01**01)

Ref. No.	Part code	Description
1	AVCHASS004	Chassis assy
1- 1	MB771SL005	Chassis
1- 2	VX777DN001	Chassis outsert
1- 3	MT322LY001	Gear shaft A
1- 4	MT222LY001	Gear shaft B
1-11	VF287KB001	Disc drawer table
1-12	MW171LD001	Ring, lock
1-13	ZNM0022801	Disc motor, RF-310T
2	VB872SB012	Loading box
3	VX662DN001	Lever, lock
4	VU761SB001	Table, loading
5	MX665SL002	Chuck arm
6	VF297DN001	Cam gear
7	VF187DN001	Chuck
9	VM165DN002	Gear, sled(A)
10	VM286DN002	Gear, sled(B)
11	VM286DN003	Gear, sled(C)
12	VM184DN001	Gear, loading(A)
13	VM284DN001	Gear, loading(B)
14	VM276DN002	Gear, loading(C)
15	VZ221DN002	Gear base, pickup
16	VF162DN001	Roller
17	VX331DN001	Down lever
18	MW221LY003	Spring, down lever
19	MW331LY003	Spring, up table
21	SF010204ZE	Limit SW, pickup
22	SF020203ZE	Limit SW, Disc table
25	MT730LY001	Shaft, pickup(A)
26	MT630LY001	Shaft, pickup(B)
28	ZNM0062101	Motor, pickup
29	HLPSR3001S	Laser pickup
30	ACCNV58UCA	Connector for motors
31	ACCNV59UCA	Connector for SWs
32	VM272KB001	Slide ring
33	MW271LY009	Spring table
35	MB631SB001	Chuck arm support
36	VS327RF005	Dumper, chuck (A)
37	VS317RF006	Dumper, chuck (B)
38	VS217RF008	Cushion
39	VF142RB001	Dumper, disc table
40	MF144BD001	Collar, pickup gear
41	ML342SL004	Bracket, box
42	VS716XF003	Sheet, blind
43	MD602LX001	Sheet chuck
44	MT612BD001	Box stopper
45	AVMOTOR005	Disc motor assy
B 1	BTP43008PZ	Screw, M3x8
B 2	BTP43010PZ	Screw, M3x10
B 3	BSPB2605NZ	Screw, M2.6x5
B 4	BSPP2005NZ	Screw, M2x5
B 5	BWK17325KU	Slider, plastic
B 6	BSPB2606NZ	Screw, M2.6x6
B 7	BTPP2305AZ	Screw, M2.3x5
B 8	BWM30A08SZ	Washer
B 9	BTPB3006TZ	Screw, M3x6
B10	BCA1540XLD	Stop ring

Bracket kit (AYF1MU**04)

Ref. No.	Part code	Description
11121	MS532SL001	Bracket, front
11122	VM176RB014	Damper, front
11123	MT265SZ004	Shaft
11124	MZ643SL001	Bracket, rear
11125	VM176RB006	Damper
11126	VT276SB001	Slide ring
11127	MS532SL002	Bracket, front&rear
B11122	BTPB3008TZ	Screw, M3x8
B11123	BTP43008PZ	Screw, M4.3x8

Main PC board assy (AP111, APSCD002EH)

Ref. No.	Part code	Description
	PSCD002C0X	PC board, unassembled
	MU422SD001	Shield, for LPF
B801	BTPW3008BZ	Screw, M3x8
C101	CEVGR47ALX	Capacitor, elect 0.47/50V
C102	CEVG010ALX	Capacitor, elect 1/50V
C103-4	CEVB330ALX	Capacitor, elect 33/6.3V
C108	CEVB330ALX	Capacitor, elect 33/6.3V
C112	CEVB330ALX	Capacitor, elect 33/6.3V
C301-2	CEVE100ALX	Capacitor, elect 10/25V
C307	CEVG010ALX	Capacitor, elect 1/50V
C308	CQ4B683KTH	Capacitor, film 0.068
C309	CEVG4R7ALX	Capacitor, elect 4.7/50V
C317	CEVC101ALX	Capacitor, elect 100/10V
C321	CEVC330ALX	Capacitor, elect 33/10V
C324	CQ4B273KTH	Capacitor, film 0.027
C326	CEVC220ALX	Capacitor, elect 22/10V
C327	CEVGR22ALX	Capacitor, elect 0.22/50V
C329-30	CEVE100ALX	Capacitor, elect 10/25V
C331	CQ4B183KTH	Capacitor, film 0.018
C333	CEVD100ALX	Capacitor, elect 10/16V
C334	CEVG2R2ALX	Capacitor, elect 2.2/50V
C337	CEVG010ZMN	Capacitor, elect 1/50V(MS)
C341	CEAC101ALX	Capacitor, elect 100/10
C342	CEVG010ALX	Capacitor, elect 1/50V
C344-5	CEVE100ALX	Capacitor, elect 10/25V
C346	CEVD100NLX	Capacitor, elect 10/16(BP)
C347	CEVE100ALX	Capacitor, elect 10/25V
C350	CQ4B104KEH	Capacitor, film 0.1
C351	CEVG010ALX	Capacitor, elect 1/50V
C355	CEVGR22ALX	Capacitor, elevt 0.22/50V
C501-2	CEVG4R7ALX	Capacitor, elect 4.7/50V
C503	CEVG010ALX	Capacitor, elect 1/50V
C504	CEVB330ALX	Capacitor, elect 33/6.3V
C507	CEVG010ALX	Capacitor, elect 1/50V
C508	CEVC101ALX	Capacitor, elect 100/10V
C511	CQSC222JEB	Capacitor, stylo 2200p
C513	CEVB330ALX	Capacitor, elect 33/6.3V
C514	CQSC222JEB	Capacitor, stylo 2200p
C515	CEVC331ALX	Capacitor, elect 330/10V
C516-7	CEVB330ALX	Capacitor, elect 33/6.3V
C521	CQ4B222KTH	Capacitor, film 0.022
C522	CQ4B222JTH	Capacitor, film 0.022
C523	CQ4B332JTH	Capacitor, film 0.033
C524	CQ4B122JTH	Capacitor, film 1200p
C525	CQ4B332JTH	Capacitor, film 0.033
C526	CQ4B222KTH	Capacitor, film 0.022
C527	CEVD100ALX	Capacitor, elect 10/16V
C528	CEVD100ALX	Capacitor, elect 10/16V
C530	CEVG2R2ALX	Capacitor, elect 2.2/50V
C533	CQ4B222KTH	Capacitor, film 0.022

Main PC board assy (continued)

Ref. No.	Part code	Description
C534	CQ4B222KTH	Capacitor, film 0.022
C535	CQ4B332JTH	Capacitor, film 0.033
C536	CQ4B122JTH	Capacitor, film 1200p
C537	CQ4B332JTH	Capacitor, film 0.033
C538	CQ4B222KTH	Capacitor, film 0.022
C540	CEVG2R2ALX	Capacitor, elect 2.2/50V
C542	CEVC101ALX	Capacitor, elect 100/10V
C544	CEVD100NLX	Capacitor, elect 10/16(BP)
C545	CQ4B224KTH	Capacitor, film 0.22
C548-9	CQSC332JEB	Capacitor, film 0.033
C603-4	CEVC101ALX	Capacitor, elect 100/10V
C804	CEAD331UMN	Capacitor, elect 330/16
C805	CEVF470ALX	Capacitor, elect 47/35V
C807	CEVC221ALX	Capacitor, elect 220/10V
C810	CEVC470ALX	Capacitor, elect 47/10V
C812-3	CEAE222UMN	Capacitor, elect 2200/25V
C814-5	CEVD101ALX	Capacitor, elect 100/16V
C818-9	CEVC470ALX	Capacitor, elect 47/10V
C822-3	CQ4B104KTH	Capactior, film 0.1
CN301-2	YJF04S088Z	Connector, 4p
CN303	YJF06S035Z	Connector, 6p
CN304	YJF05S021Z	Connector, 5p
CN306	YJF08S088Z	Connector, 8p
CN307-10	YJF06S185U	Connector, 6p
CN601	YJF04S088Z	Connector, 4p
D301-2	QDCVC321CC	Vari-cap diode, SVC321SP
D303-4	QDZ1051M#N	Zenner diode, MA1051
D305-12	QDSMA165#N	Diode, MA165
D313	QDSMA150XN	Diode, MA150
D501	QDZ1047H#N	Zenner diode, MA1047
D601	QDSMA165#N	Diode, MA165
D801	QDSW02XXXZ	Diode, W02RL
D802	QDSN4003AZ	Diode, 1N4003
D803-4	QDZ1082M#N	Zenner diode, MA1082
D805-6	QDZ1056M#N	Zenner diode, MA1056
HS801-2	MU424AD001	Heatsink
J501	YJP02S034Z	OUTPUT jack
L301	TR07QR006S	Coil, VCO 7uH
L501	LF010KE09T	Coil, choke 1mH
L502-3	FJRR20C01S	Low pass filter
L601	LF100KE#9T	Choke coil, 10uH
Q301	QTC2060XTX	Tr., 2SC2060(Q,R)
Q302	QTA0934XTX	Tr., 2SA934(Q,R)
Q303	QTC1162XAB	Tr., 2SC1162(C,D)
Q304	QTA0934XTX	Tr., 2SA934(Q,R)
Q305	QTC2060XTX	Tr., 2SC2060(Q,R)
Q306	QTA0934XTX	Tr., 2SA934(Q,R)
Q307	QTC2060XTX	Tr., 2SC2060(Q,R)
Q308	QTA0934XTX	Tr., 2SA934(Q,R)
Q309	QTC2060XTX	Tr., 2SC2060(Q,R)

Main PC board assy (continued)

Ref. No.	Part code	Description
Q310	QTA0934XTX	Tr., 2SA934(Q,R)
Q311	QTA1015XTT	Tr., 2SA1015(Y,GR)
Q312	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q313	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q314	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q315-6	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q501-2	QTK0136XBN	FET, 2SK136(S)
Q503-6	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q507-8	QTA1015XTT	Tr., 2SA1015(Y,GR)
Q601	QTC2060XTX	Tr., 2SC2060(Q,R)
Q602	QTC1815XTT	Tr., 2SC1815(Y,GR)
Q603	QTA1015XTT	Tr., 2SA1015(Y,GR)
Q801-2	QTK0364XAT	FET, 2SK364(BL)
Q803	QTC2060XTX	Tr., 2SC2060(Q,R)
Q804	QTA0934XTX	Tr., 2SA934(Q,R)
Q805	QTC1162XAB	Tr., 2SC1162(C,D)
Q806	QTA0715XBB	Tr., 2SA715(C,D)
R301	RX1ATJ100B	Res., metal-oxide 10, 1W
R305	RX1ATJ100B	Res., metal-oxide 10, 1W
R356-7	RG1ATJ150B	Res., metal-oxide 15, 1W
R374-5	RG1ATJ330B	Res., metal-oxide 33, 1W
R390	RG1ATJ820B	Res., metal-oxide 82, 1W
R543	RGHATJ561B	Res., metal-oxide 560, 1/2W
R602	RD18PF0220	Res., metal-oxide 22 (±1%)
R609	RD18PF1502	Res., metal-oxide 15k(±1%)
R610	RD18PF1002	Res., metal-oxide 10k(±1%)
R611	RD18PF2201	Res., metal-oxide 2.2k(±1%)
R612	RD18PF4700	Res., metal-oxide 470(±1%)
R801	RG1ATJ751B	Res., metal-oxide 750, 1W
R802	RXHATJ100B	Res., metal-oxide 10, 1/2W
R803-4	RXHATJ2R2B	Res., metal-oxide 2.2, 1/2W
R805	RG1ATJ150B	Res., metal-oxide 15, 1/2W
R808	RG2ATJ180B	Res., metal-oxide 18, 2W
RV101-2	RP1NB104#1	Potentiometer, 100k(B)
RV301-2	RP1NB203#1	Potentiometer, 20k(B)
RV303	RPPNB50201	Potentiometer, 5k(B)
U101	QQ020109AS	IC, CX20109
U301	QQ023035AS	IC, CX23035
U302	QQ006116A&	IC, HM6116LP-4
U303	QQ020108AS	IC, CX20108
U304	QQ0004043B	IC, HD614042 SD35
U305	QQM17558AB	IC, HA17558
U306	QQM05221BE	IC, M5221P
U307	QQM17558AB	IC, HA17558
U501	QQ020152AS	IC, CX20152
U502	QQ004053B&	IC, 4053
U503-4	QQM05221BE	IC, M5221P
U505	QQM05218BE	IC, M5218P
X301	XAZ1E3001S	X'tal 8.47MHz
X501	XAZ3A4001S	X'tal osc, 35.002MHz

Power PC board assy (AP112, APSZZ270CH)

Ref. No.	Part code	Description
	PSZZ270C0X	PC board, unassembled
C101	CKDU472MUM	Capacitor, ceramic 4700p
P103	ACCNY11EEA	Connector, trans.-fuse
S101	SP01ZAW01W	Switch, power
T101	TPG48S002T	Power trans., 220V

Fuse PC board assy (AP113, APSZZ268AH)

Ref. No.	Part code	Description
	YHF0P0001Z	Fuse holder
	PSZZ268C0X	PC board, unassembled
F01-2	ZFBQ63101A	Fuse, 630mA 250V
F03	ZFBQ80001A	Fuse, 80mA 250V
P102	WP04158ZGT	PC joint

Display PC board assy (AP114, APSDS029AH)

Ref. No.	Part code	Description
	PSDS029C0X	PC board, unassembled
91	VS526RF002	Sponge, shield
92-4	VQ211RB011	Rubber spacer, LED
D901-2	QDZ2R7EBHA	Zener diode, 2.7V
FL901	ZL9ST20ZK7	FL display tube
KS01-10	SK0101X%3T	Key switch
LD901	QLAR5551KR	LED, red
LD902	QLAG5551KR	LED, green
LD903	QLAA5551KR	LED, red
LD904-6	QLAR5551KR	LED, yellow
P901-2	WP08158ZGT	PC joint, 8p
P903	WP06185ZGT	PC joint, 6p
P904	WP07185ZGT	PC joint, 7p

NESCO HCD-50:

General-1 (Set ass'y elements)

Ref. No.	Part code	Description
11	AYHCD50*01	Chassis Ass'y
12	AYHCD50*02	Front Frame Ass'y (D-gold)
12	AYHCD50B02	Front Frame Ass'y (Black)
13	VE73JSM003	Lid, Disc Drawer (D-gold)
13	VE73JSM004	Lid, Disc Drawer (Black)
14	VS734AK004	Filter, Display (D-gold)
14	VS734AK005	Filter, Display (Black)
15	MU886DX014	Top Cover (D-gold)
15	MU886DX013	Top Cover (Black)
16	VS445VF001	Sheet, Blind
18	KC000456XX	Caution Tag for Transportation
1A	KC000458XX	Caution Tag on Disc Lid
B11	BTPS3006TZ	Screw, M3x6, front frame
B12	BTPB4008TB	Screw, M4x8, top cover

General-2 (Chassis ass'y, AYHCD50*01)

Ref. No.	Part code	Description
111	MB886SK014	Chassis
112	AMF1MU**01	Disc mechanism & bracket
1121	AMCD01**01	Disc mechanism assy
1122	AYF1MU**04	Bracket part kit
113	MW271LY008	Spring, mechanism
115	VN333SB001	Knob, power
115	VN333SB005	Knob, power
116	VK163SB004	Plate, lock
117	MT563SZ004	Shaft (B)
118	VM174RB001	Pedestal
119	MS317SZ006	Plate
11A	MB544SL001	Bracket, mechanism(rear)
11B	VS228RF006	Sponge
11C	VS428RF002	Sheet
11D	MB111SZ001	Bracket
11E	VS643VF001	Barrier, fuse
11F	MB111SZ001	Bracket for AP114
AC111	ACAC269EEA	AC cord + plug
AC112	ACZZ507ULA	Earth wire
AC112-3	ACZZ507ULA	Earth wire
AC113	ACZZ507ULA	Earth wire
ACB111	VM270NB004	Bushing, AC cord
AP111	APSCD002FH	PC board assy, main
AP112	APSZZ270CH	PC board assy, power
AP113	APSZZ268AH	PC board assy, fuse
AP114	APSZZ275AH	PC board assy, control
B111	BTPB4008TZ	Screw, M4x8
B112	BTPS3006TZ	Screw, M3x6
B113	BTPB3006TZ	Screw, M3x6
B114	BTPB3008PB	Screw, M3x8
B115	BTPB3010T2	Screw, M3x10 (shipping)
B116	BRP4050QNB	Rivet, plastic M4x5
B117	BSPB3012NB	Screw, M3x12, fuse PC board
B119	BTPB3006TZ	Stopper, power SW
B11A	BSPS3012NN	Screw, M3x6

Front frame ass'y (AYHCD50*02)

Ref. No.	Part code	Description
121	VE86JSM065	Front frame (D-gold)
121	VE86JSM080	Front frame (Black)
122	VN270SK006	Frame, button
123	VN442SK003	Button, stop
AP115	APSDS030AH	PC board assy, display
AP116	APSZZ274AA	PC board assy, remote
B121	BTPP2608PZ	Screw, M2.6x8

Miscellaneous

Ref. No.	Part code	Description
31	KTHCD50*01	Owner's manual
32	KF243400E4	Plastic Bag
33	KW000436XX	Warranty card
41	KPHCD50*01	Carton (D-gold)
41	KPHCD50*02	Carton (Black)
43	KNCD200*01	Partitioner(L)
44	KNCD200*02	Partitioner(R)
47	KMHCD50*01	Master Carton
51	ACSP023GEA	Stereo audio cable
52	AZHCD50*01	Remote Controler (D-gold)
52	AZHCD50*02	Remote Controler (Black)

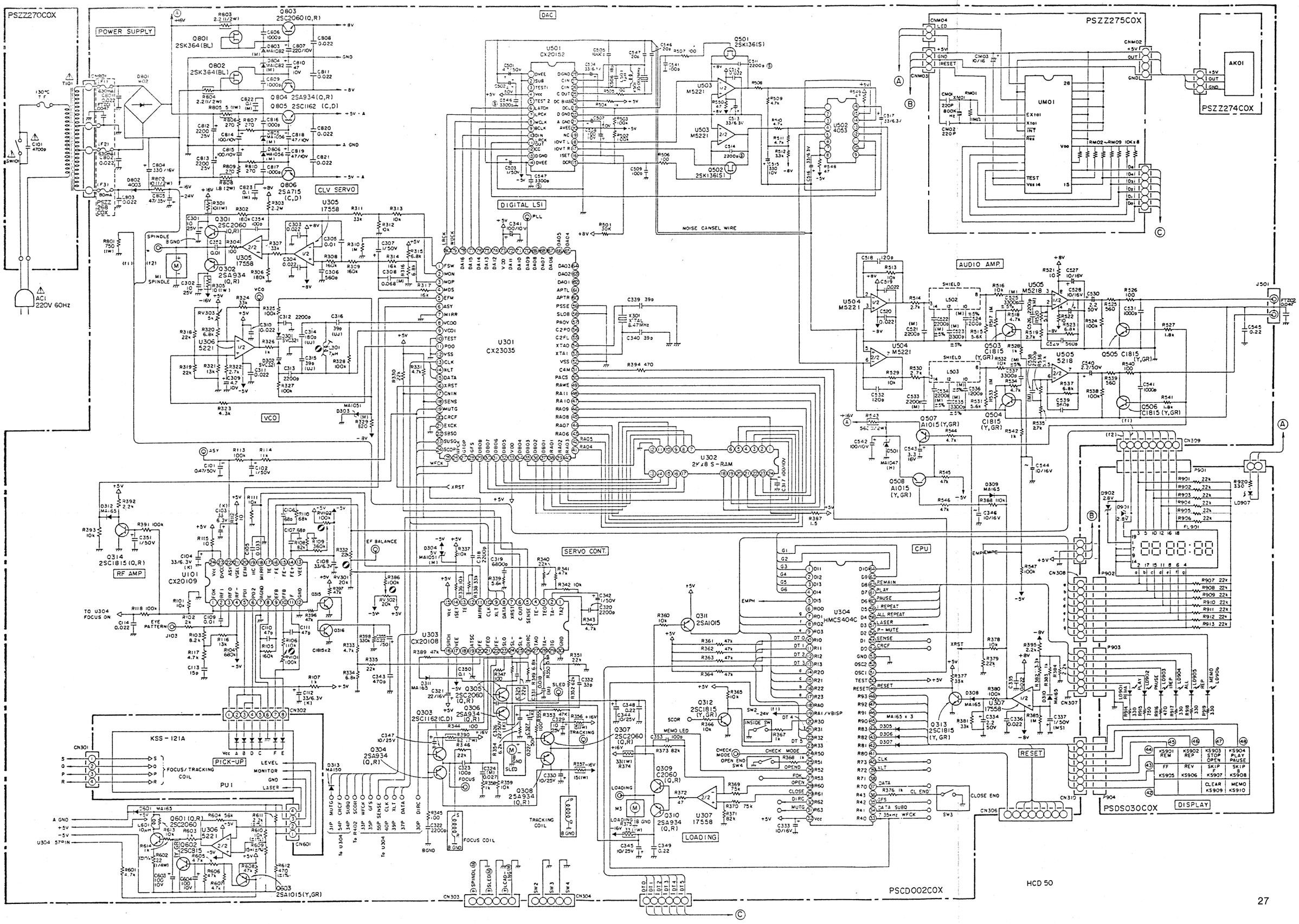
NESCO HCD-50:

Display PC board ass'y (AP115, APSDS030AH)

Ref. No.	Part code	Description
	PSDS030C0X	PC board, unassembled
91	VS526RF002	Sponge, shield
92,93	VQ211RB004	Rubber spacer, LED
D901-2	QDZ2R7EBHA	Zener diode, 2.7V
FL901	ZL9ST20ZK7	FL display tube
KS901-10	SK0101X%3T	Key switch
LD901	QLAR5551KR	LED, red
LD902	QLAG5551KR	LED, green
LD903	QLAA5551KR	LED, red
LD904-7	QLAR5551KR	LED, yellow
P901-2	WP08158ZGT	PC joint, 8p
P903	WP06185ZGT	PC joint, 6p
P904	WP07185ZGT	PC joint, 7p
P905	ACCNY64UCA	Connector
R901-911	RD20PJ223X	Res., carbon 22k
R914	RD20PJ331X	Res., carbon 330
R915,916	RD20PJ241X	Res., carbon 240
R917-919	RD20PJ331X	Res., carbon 330

P.W. Board

Ref. No.	Part code	Description
	PSZZ275C0X	P.W. Board
CNM01	YJF06S035Z	Connector
CNM02	YJF04S043Z	Connector
CNM03	YJF03S042Z	Connector
CNM04	YJF02S041Z	Connector
RM01	RDZ2PJ105X	Res.,carbon 1M
RM02	RD25PJ103X	Res.,carbon 10k
RM03	RD25PJ103X	Res.,carbon 10k
RM04	RD25PJ103X	Res.,carbon 10k
RM05	RD25PJ103X	Res.,carbon 10k
RM06	RD25PJ103X	Res.,carbon 10k
RM07	RD25PJ103X	Res.,carbon 10k
RM08	RD25PJ103X	Res.,carbon 10k
RM09	RD25PJ103X	Res.,carbon 10k
CM01	CCFB221K0M	Ceramic.Cap 220p
CM02	CCFB221K0M	Ceramic.Cap 220p
CM03	CEVD100ALX	Elyt.Cap 10u/16V
UM01	QQN06416CC	IC LM6416E
XM01	CX0800003M	Osc XTal 800KHz


PSZZ270COX
POWER SUPPLY
DAC
PSZZ275COX
PSZZ274COX
AKOI
UMO1
CLV SERVO
DIGITAL LSI
NOISE CANSEL WIRE
AUDIO AMP
VCO
SERVO CONT.
CPU
RESET
DISPLAY
PSDS030COX
PSCD002COX
HCD 50
KSS-121A
PICK-UP
PU1
FOCUS/TRACKING COIL
FOCUS COIL
TRACKING COIL
LOADING
RF AMP
EF BALANCE
U301 CX23035
U302 2K x 8 S-RAM
U303 CX20108
U304 HMCS404C
U305 17558
U306 5221
U307 17558
U501 CX20152
U503 M5221
U504 M5221
U505 M5218
U505 5218
U101 CX20109
U502 4053
Q801 2SK364(BL)
Q802 2SK364(BL)
Q803 2SC2060(Q,R)
Q804 2SA934(Q,R)
Q805 2SC1162 (C,D)
Q806 2SA715 (C,D)
Q501 2SK136(S)
Q502 2SK136(S)
Q301 2SC2060 (Q,R)
Q302 2SA934 (Q,R)
Q303 2SC1162(C,D)
Q304 2SA934 (Q,R)
Q306 2SA933 (Q,R)
Q307 2SC2060 (Q,R)
Q308 2SA934 (Q,R)
Q309 C2060 (Q,R)
Q310 2SA934 (Q,R)
Q311 2SA1015
Q312 2SC1815 (Y,GR)
Q313 2SC1815 (Y,GR)
Q314 2SC1815 (O,R)
Q503 C1815 (Y,GR)
Q504 C1815 (Y,GR)
Q505 C1815 (Y,GR)
Q506 C1815 (Y,GR)
Q507 A1015 (Y,GR)
Q508 A1015 (Y,GR)
Q601 (O,R) 2SC2060
Q602 2SC945
Q603 2SA1015(Y,GR)
SPINDLE
SLED
LOADING
TRACKING
FOCUS
VCO
MUTE
LEVEL
MONITOR
GND
LASER
DISPLAY
CLOSE END
OPEN END
INSIDE SW
CHECK MODE
LOADING LED
MEMO LED
REMAIN
PLAY
PAUSE
1-REPEAT
ALL REPEAT
P-MUTE
SENSE
CRCF
RESET
CLK
XLT
DATA
SFS
7.35kHz WFCK
SUBQ
FOK
FOCUS OPEN
FOCUS CLOSE
DIRC
MUTG
TRACKING OPEN
TRACKING CLOSE
SPINDLE
SLED
LOADING
SW2
SW3
SW4
CN301
CN302
CN303
CN304
CN306
CN307
CN308
CN309
CN310
J501
J103
AC1 220V 60Hz
T101
SW101
F101
F201
F301
130°C T.F
D801 W02
TO U304 FOCUS ON
EYE PATTERN
TO U304 57PIN
A GND
BGND
KS901 REM
KS902 REP
KS903 STOP OPEN
KS904 PLAY PAUSE
FF
REV
SKIP
KS905
KS906
KS907
KS908
CLEAR
KS909
MEMO
KS910